Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Research Document 2017/002

Quebec Region

Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2016 in the Estuary and northern Gulf of St. Lawrence

Hugo Bourdages, Claude Brassard, Mathieu Desgagnés, Peter Galbraith, Johanne Gauthier, Benoît Légaré, Claude Nozères and Eric Parent

Fisheries and Oceans Canada
Maurice Lamontagne Institute
850 Route de la Mer
Mont-Joli, Quebec G5H 3Z4

January 2017

Canada

Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the Secretariat.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca

© Her Majesty the Queen in Right of Canada, 2017
ISSN 1919-5044

Correct citation for this publication:

Bourdages, H., Brassard, C., Desgagnés, M., Galbraith, P., Gauthier, J., Légaré, B., Nozères, C. and Parent, E. 2017. Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2016 in the Estuary and northern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2017/002. v + 87 p.

Aussi disponible en français :

Bourdages, H., Brassard, C., Desgagnés, M., Galbraith, P., Gauthier, J., Légaré, B., Nozères, C. et Parent, E. 2017. Résultats préliminaires du relevé multidisciplinaire de poissons de fond et de crevette d'août 2016 dans l'estuaire et le nord du golfe du Saint-Laurent. Secr. can. de consult. sci. du MPO. Doc. de rech. 2017/002. v + 88 p.

TABLE OF CONTENTS

ABSTRACT IV

RÉSUMÉ V

INTRODUCTION 1

SURVEY DESCRIPTION 1

DATA ANALYSIS 3

RESULTS 4

- BIODIVERSITY 4
  - Fish 4
  - Invertebrates 5
- PHYSICAL OCEANOGRAPHIC CONDITIONS 5

ACKNOWLEDGEMENTS 6

REFERENCES 6

FIGURES 7

APPENDICES 77

ABSTRACT

Fisheries and Oceans Canada conducts an annual multidisciplinary survey in the Estuary and northern Gulf of St. Lawrence. The objectives of this survey are varied: assess the biodiversity of species found near the sea bottom, estimate the abundance of groundfish and invertebrates, assess physical and biological oceanographic conditions (phytoplankton and zooplankton), monitor the pelagic ecosystem, take inventories of marine mammals and seabirds, and collect samples for various research projects. In 2016, the survey was conducted between August 1 and September 2 on board the *CCGS Teleost*. The survey successfully carried out 167 trawl tows as well as 109 CTD water column casts, and 70 zooplankton samples.

This report presents the results from catches from the 167 tows. In total, 76 fish taxa and 196 invertebrate taxa were identified during the mission. Historical perspectives (catch rates, spatial distribution and length frequency) are presented for 23 taxa. These commercial fishery-independent data will be used in several stock assessments (e.g., cod, redfish, Greenland Halibut, Atlantic Halibut and Northern Shrimp). The increase in biomass of Deepwater Redfish (*Sebastes mentella*) is significant, accounting for almost two thirds of the total catch. The biomass of Cod, Greenland Halibut and Atlantic Halibut remains steady while the biomass of Northern Shrimp is decreasing.

A preliminary analysis of water temperature data collected in 2016 shows that conditions have remained warm in deep waters (150 m and 200 m) and have warmed further (record since 1915) at 300 m. The August cold intermediate layer and summer surface waters were slightly warmer on average in 2016 than during the same period in 2015.

RÉSUMÉ

Pêches et Océans Canada réalise annuellement un relevé multidisciplinaire dans l'estuaire et le nord du golfe du Saint-Laurent. Les objectifs de ce relevé sont multiples : évaluer la biodiversité des espèces présentes près du fond; estimer l'abondance des poissons de fonds et des invertébrés; évaluer les conditions océanographiques physiques et biologiques (phytoplancton et zooplancton); monitorer l'écosystème pélagique; inventorier les mammifères et les oiseaux marins; et récolter des échantillons pour divers projets de recherche. En 2016, le relevé s'est déroulé du 1er août au 2 septembre, à bord du *NGCC Teleost*. Lors de cette mission, 167 traits de chalut ont été réussis ainsi que 109 profils verticaux de la colonne d'eau afin de caractériser les conditions océanographies et 70 échantillons de zooplancton.

Ce rapport présente les résultats des captures des 167 traits de chalut. Au total, 76 taxons de poissons et 196 taxons d'invertébrés ont été identifiés lors de la mission. Les perspectives historiques (taux de capture, répartition spatiale, fréquence de longueur) sont présentées pour 23 taxons. Ces données indépendantes de la pêche commerciale serviront à plusieurs évaluations de stocks, dont la morue, les sébastes, le flétan du Groenland, le flétan atlantique et la crevette nordique. L'augmentation de la biomasse de sébaste atlantique (*Sebastes mentella*) est significative, à lui seul, il constituait près des deux-tiers du total des captures. Les biomasses de la morue, du flétan du Groenland et du flétan atlantique se maintiennent alors que la biomasse de la crevette nordique diminue.

L'analyse préliminaire des données de température de l'eau mesurée en 2016 montre des conditions qui se sont maintenues chaudes à 150 et 200 m et qui se sont réchauffées (record depuis 1915) à 300 m. La couche intermédiaire froide du mois d'août ainsi que les eaux de surface estivales étaient légèrement plus chaudes en moyenne en 2016 qu'aux mêmes périodes de 2015.

INTRODUCTION

Fisheries and Oceans Canada conducts an annual bottom trawl survey in the Estuary and the northern Gulf of St. Lawrence. This is a multi-species, commercial fishery-independent survey. Its purpose is to assess the ecosystem with consistent, standardized protocols to examine the spatial and temporal changes in 1) the distribution, relative abundance and assemblages of fishes, and 2) the biological parameters of commercial species.

The main objectives are to:

1. assess groundfish and Northern Shrimp population abundance and condition;
2. assess environmental conditions;
3. take a biodiversity inventory;
4. assess phytoplankton and mesozooplankton abundance;
5. monitor the pelagic ecosystem;
6. take an inventory of marine mammals;
7. take an inventory of seabirds;
8. collect samples for various research projects.

In 2016, the survey was conducted between August 1 and September 2 on board the *CCGS Teleost* (mission IML-2016-037).

SURVEY DESCRIPTION

The survey covers the waters of the Laurentian Channel and north of it, from the Lower Estuary in the west to the Strait of Belle Isle and the Cabot Strait in the east, namely, the Northwest Atlantic Fisheries Organization (NAFO) divisions 4R, 4S and the northern part of 4T (Figure 1). Since 2008, coverage of division 4T has been increased in the upstream part of the Lower Estuary in order to sample the depths between 37 and 183 m. The area of the study area is 118,587 km^2.

A stratified random sampling strategy is used for this survey. This technique consists in subdividing the study area into more homogeneous strata. This area is divided into 54 strata, which were divided based on depth, NAFO division and substrate type (Figure 2). A total of 200 trawl stations was initially allocated in the study area, a number proportional to the stratum surface, with a minimum of two stations per stratum. The tow positions were chosen randomly within each stratum. Since 2014, a new rule was added to respect a minimum distance of 10 km between stations in the same stratum.

The fishing gear used on the *CCGS Teleost* is a four-sided Campelen 1800 shrimp trawl equipped with a Rockhopper footgear ("bicycle") (McCallum and Walsh 2002). The trawl lengthening and codend are equipped with a 12.7-mm knotless nylon lining. Standard trawling tows last 15 minutes, starting from the time the trawl touched the sea floor as determined by the *Scanmar*™ hydroacoustic system. Towing speed is 3 knots. Information on trawl geometry (horizontal spread of the doors and wings, vertical opening of the trawl, depth) was recorded for each tow using *Scanmar*™ hydroacoustic sensors mounted on the fishing gear.

In 2016, 167 fishing stations were successful, 48 in 4R, 79 in 4S and 40 in 4T (Appendix 1). Coverage of the study area was very good; only one stratum strata were not covered with a minimum of two stations (Figure 3, Annexe 1).

For each fishing tow, the catch was sorted and weighed by taxa; biological data were then collected. For fish, crab and squid, size and weight are gathered by individual and, for some species, sex, gonad maturity, and the weight of certain organs (stomach, liver, gonads) are also

evaluated. Count of soft rays of the anal fin for Redfish, and otoliths are saved for Atlantic Cod, Atlantic Halibut, and Witch Flounder. A roughly 2-kg shrimp sample is sorted and weighed by species (and by stage of maturity for Northern Shrimp). The shrimp are measured individually. The other invertebrates are counted (no individual measurements) and photographed. The photos are archived in a photo catalogue with keywords (station description, scientific name, etc.).

In recent years, efforts to better describe catches of non-commercial species have intensified. Efforts were increased in 2003 for fish and in 2006 for invertebrates. An identification guide for marine fishes of the estuary and northern Gulf of St. Lawrence (Nozères et al. 2010) and a guide for invertebrates (Nozères et al. 2014) were used to identify most taxa at the species level.

Additional samples were taken for various scientific projects. These samples include:

1. Small fishes (Variegated Snailfish, Atlantic Spiny Lumpsucker, Eelpouts, Unernaks) and invertebrates (Ascidians, sponges) to verify their identification and to add to the permanent collection at the Maurice Lamontagne Institute (MLI);
2. Boxes of shrimp and capelin for requests for aquaculture purposes from the MLI tank room;
3. Black Dogfish embryos and juveniles, and Skate capsules in order to study their developmental morphology and their chondrification and mineralization processes;
4. Invasive species (tunicates) to confirm their genetic and microscopic identification;
5. Fish stomachs (Atlantic Halibut, Greenland Halibut, Lumpfish, White Barracudina, Cod, American Plaice, Witch Flounder, Redfish) and squid (Short-fin Squid) to enhance knowledge of their diet;
6. Silver Hake studied for its trophic role, growth and origin;
7. Small redfish (< 11 cm) for genetic identification of the species (*Sebastes fasciatus* or *S. mentella*) and the population of new cohorts observed in the Gulf;
8. Greenland Halibut to study the population dynamic;
9. Marine mammal prey (several fish species and Northern Shrimp) to follow the development of St. Lawrence ecosystem key species' isotropic signatures;
10. Capsules of Skate to identify them to the species and to locate the spawning sites.

Oceanographic conditions such as temperature, conductivity (salinity), turbidity, dissolved oxygen, luminosity and fluorescence were sampled during this survey. A total of 109 vertical profiles of the water column were done, 18 of which were at extra stations that fall under the Atlantic Zone Monitoring Program (AZMP). The various equipment, *CTD SeaBird 911Plus*™, dissolved oxygen sensor (*SBE 43*), photometer (*Biospherical*) and fluorometer (*Eco-FLNTU Wetlabs*) are coupled to the rosette of Niskin bottles. For each profile obtained using the rosette, water samples are also taken at many depths to determine their salinity, dissolved oxygen concentration (Winkler titration), nutritive salt content (nitrite, nitrate, phosphate, silicate) and chlorophyll content. In addition, a *CTD SBE 19Plus*™ device (temperature and salinity), coupled to a dissolved oxygen sensor (*SBE 63*), was also installed on the back of the trawl, thereby allowing oceanographic data to be collected for the 167 fishing tows.

To study zooplankton distribution and biomass for the entire territory covered by the survey, a sampling program component consisted in using a zooplankton net (202 µm), pulled vertically from the floor to the surface at 70 stations.

Continuously throughout the mission, water column hydroacoustic data at four frequencies (38, 70, 120 and 200 kHz) were recorded using a *SIMRAD™ EK60* echosounder. These data will be used to develop a three-dimensional database to map the pelagic ecosystem.

A marine mammal and seabird inventory in the study area was taken by two observers stationed at the front of the bridge when conditions permitted.

DATA ANALYSIS

The analysis of 2016 abundance and biomass data were integrated into the combined annual summer survey series initiated in 1990. This combined series was developed following a comparative study between the two vessel-gear tandems (1990-2005: *CCGS Alfred Needler – URI 81'/114'* trawl; 2004-2016: *CCGS Teleost – Campelen 1800* trawl) to establish specific correction factors for about twenty species caught (Bourdages et al. 2007). This resulted in adjustment of *Needler* catches into *Teleost* equivalent catches.

Given that over the years, some strata were not sampled by a minimum of two successful tows (Appendix 1), a multiplicative model was used to estimate their catch rate indexes in number and weight. This model provides a predicted value for strata with less than two tows with the data of the current year and the previous three years. Thus, indicators presented for the series are representative of a standard total area 116 115 km^2, the sum of the area of all strata. In addition, reference points were also added to the catch rate figures. The solid line represents the 1990-2015 period average (long-term average) and the two dotted lines associated to the mean ±0.5 standard deviation corresponding respectively to the upper and lower reference limits. Note that for Capelin and Herring, the calculated indices are instead probability values (%) of encountering species during the survey. Indeed, due to the pelagic character of these two species, the bottom trawl is not an ideal fishing gear for their capture and, therefore, to accurately estimate abundance.

Note that the distinction between the two redfish species, *Sebastes fasciatus and S. mentella*, is based on the analysis of the soft anal fin rays count and the depth of capture of individuals (H. Bourdages, DFO Mont-Joli, pers. comm.).

Length frequency distributions are presented in two different forms. The first figure shows the distribution for the last two years of the series plus the average distribution for the 1990-2015 period (long-term average distribution). Frequency values are expressed as the average number of individuals caught per tow in increment of 1 cm, except for Northern Shrimp (0.5 mm) and Atlantic Halibut (3 cm). The second figure represents the length distributions in length mean per class length for each year of the historical surveys series (1990 to 2016).

The geographical distribution of catches by weight per tow (kg/15 minutes tow, except for sea pens number/15 minutes tow) was made for periods of four years. The interpolation of CPUE was performed on a grid covering the study area using a ponderation inversely proportional to the distance (R version 2.13.0, Rgeos library; R Development Core Team 2011). The isoline contours were then plotted for four CPUE levels which approximate the 20^{th}, 40^{th}, 60^{th} and 80^{th} percentiles of the non-zero values. The catch rates distribution for the 2016 survey only is also presented in a bubbles type map.

The preliminary results for the abundance and biomass indices, the catch rate distribution maps, and the size frequency distributions for about 20 taxa commercially fished are presented at figures 4 to 60. These results are preliminary and must be considered as such until validations and laboratory analyses have been completed.

The average weight per tow for 56 taxa of fish and 97 taxa of invertebrates is given in figures 61 and 62. In these figures, a color code is used to represent the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

The catches per tow for fish taxa are available on the St. Lawrence Global Observatory (SLGO).

Finally, Appendix 2 provides a list of all taxa, vertebrates and invertebrates, caught among the 167 successful tows achieved during the 2016 survey. The occurrence, or the number of tows where the species was identified, as well as the total catch, by weight and numbers, are also presented. The number of specimens measured per taxon and some descriptive statistics for the length parameter are also presented in Appendix 3.

RESULTS

Attention: the bottom trawl survey is designed to sample demersal species. However, catches may also include pelagic species and species associated with coastal or rocky habitats which are more difficult to trawl. Although these taxa are found in catches, they have a low catchability by trawl net. Some caution is required in interpreting the results obtained for these taxa.

BIODIVERSITY

In total, 76 fish taxa and 196 invertebrate taxa were identified during the mission.

Nearly three-quarters of catches consisted of Redfish.

A new species of fish, the Big Eye (*Epigonus pandionis*), was captured for the first time in the Gulf. It is a southern fish, rarely caught on the Scotian Shelf.

Fish

American Plaice (*Hippoglossoides platessoides*) and **Witch Flounder** (*Glyptocephalus cynoglossus*) were caught very frequently, and their abundance was stable.

The abundance and biomass of **Atlantic Halibut** (*Hippoglossus hippoglossus*) remained high in 2016 and are above the historical average

The abundance of **Black Dogfish** (*Centroscyllium fabricii*) decreased in 2016 and is comparable to the historical average.

The average probability of catching **Capelin** (*Mallotus villosus*) remains below the historical average for the past three years.

The abundance and biomass indices for **Cod** (*Gadus morhua*) were comparable to 2014 and 2015 levels and above the historical average. More and more Cod is being observed in 4S, especially around Anticosti Island.

The biomass of **Greenland Halibut** (*Reinhardtius hippoglossoides*) was stable and above the average since 2014. The 2015 cohort is low and explains the decline in abundance in 2016.

The average probability of catching **Herring** (*Clupea harengus*) was stable and above the average in 4R, but increased in 4S.

The abundance of **Longfin Hake** (*Phycis chesteri*) remained low, and distribution was restricted to a portion of the Laurentian Channel. None have been caught in the estuary for several years.

The **Lumpfish** (*Cyclopterus lumpus*) is low in catches but regular of this survey. Abundance and biomass have been on the rise for 4 years to reach the highest values in the historical series.

In recent years, an increase in the abundance of **Redfish** has been observed. There have been three strong cohorts of Deepwater Redfish (*Sebastes mentella*), with the most abundant being the 2011 cohort, which now has a modal length of 18 cm. These young Redfish were distributed throughout the northern Gulf.

Since 2007, **Silver Hake** (*Merluccius bilinearis*) has been present in the northern Gulf more frequently. The abundance of this species has been decreasing since 2013.

Thorny Skate (*Amblyraja radiata*) and **Smooth Skate** (*Malacoraja senta*) were very frequent in captures, and their abundance was stable.

The abundance of **White Hake** (*Urophycis tenuis*) is comparable to 2015 and is above the historical average.

Invertebrates

Biomass decreased for fifteen main **Shrimp** species found in the northern Gulf of St. Lawrence.

The abundance and biomass of **Northern Shrimp** (*Pandalus borealis*) decreased to below the historical average.

The presence of **Northern Shortfin Squid** (*Illex illecebrosus*), a southern and seasonal pelagic species, continues to be at very low levels since 2013.

The **Moon Jellyfish** (*Aurelia aurita*) had reduced presence following two years of abundant catches off the coast of Newfoundland. This species was very rarely observed before 2014 in this survey

There are four species of **Sea Pens** in the Northern Gulf of St Lawrence. The larger sea pens (*Anthoptilum grandiflorum*, *Halipteris finmarchica*, *Pennatula grandis*) are distributed in deep areas of the Laurentian Channel, while the smaller sea pen (*Pennatula aculeata*) is more widely distributed.

PHYSICAL OCEANOGRAPHIC CONDITIONS

A preliminary analysis of water temperature data collected in 2016 (Figures 63 and 64) shows that conditions have remained warm in deep waters (150 m and 200 m) and have warmed further (record since 1915) at 300 m. Compared to conditions observed in 2015, Central Gulf waters deeper than 250 m have notably warmed. The August cold intermediate layer and summer surface waters were slightly warmer on average in 2016 than during the same period in 2015.

Air temperatures over the Gulf were above normal from December 2015 to February 2016 as a result of the El Niño event, then below normal in March and April followed by near-normal to above-normal until August. This combination led to near-normal average surface water temperatures for the May–August period and slightly above-normal for July–August (+0.6 SD relative to the 1985–2010 climatology).

After this mild winter, temperatures in the summer cold intermediate water layer were above normal climatological levels by 1 SD (Figure 64), and much warmer in the Cabot Strait region (Figure 63).

Beneath the cold intermediate water layer, the estuarial flow that carries deep water to the channel heads has carried the warm waters that had been in the Cabot Strait, central Gulf and Esquiman Channel for the past few years further upstream. Consequently, temperatures measured in August have increased since 2015 at 200 and 300 m in the estuary, as well as in northwestern Gulf below 300 m (Figure 63). Note the large temperature increase since 2015 in Central Gulf below 225 m (Figure 63).

Taking into consideration all the data recorded in different months of the year, the northwestern Gulf is currently experiencing record temperatures since 1915 at 200 m (temperatures of 5.3°C). At 300 m, the four regions along the deep Laurentian Channel, meaning the Estuary, northwestern Gulf, Central Gulf and Cabot Strait, are experiencing record temperatures (5.6°C, 5.9°C, 6.3°C, 6.5°C). The Gulf-wide average temperature reached a record level since 1915 at 300 m (Figure 64).

ACKNOWLEDGEMENTS

We would like to thank both crews of the *CCGS Teleost* and wish to highlight the excellent work of the 2016 scientific team. The science team consisted of David Beauchesne, Denis Bernier, Hugo Bourdages, Claude Brassard, Sylvain Chartrand, Valérie de Carufel, Mathieu Desgagnés, Johanne Gauthier, Léopold Ghinter, Tanya Hansen, Caroline Lafleur, David Leblanc, Jean-François Lussier, Marie-Claude Marquis, Chantale Méthot, Samuel Mongrain, Claude Nozères, Éric Parent, David Picard, David Poissant, Pierre-Marc Scallon-Chouinard, Félix St-Pierre, Sylvie St-Pierre, Alexandra Valentin and Sara Wing.

Finally, we would like to thank Denis Bernier and Claude Savenkoff for reviewing this document.

REFERENCES

Bourdages, H., L. Savard, D. Archambault and S. Valois. 2007. Results from the August 2004 and 2005 comparative fishing experiments in the northern Gulf of St. Lawrence between the *CCGS Alfred Needler* and the *CCGS Teleost*. Can. Tech. Rep. Fish. Aquat. Sci. 2750: ix + 57 p.

Miller, R. and Chabot, D. 2014. Code List of Marine Plants, Invertebrates and Vertebrates Used by the Quebec Region of DFO. Can. Data Rep. Fish. Aquat. Sci. 1254: iv + 115 p.

McCallum, B. and S.J. Walsh. 2002. An update on the performance of the Campelen 1800 during bottom trawl surveys in NAFO subareas 2 and 3 in 2001. NAFO SCR Doc. 02/36. 16 p.

Nozères, C., D. Archambault, P.-M. Chouinard, J. Gauthier, R. Miller, E. Parent, P. Schwab, L. Savard, et J.-D. Dutil. 2010. Guide d'identification des poissons marins et protocoles d'échantillonnage utilisés lors des relevés annuels de l'abondance du poisson de fond dans l'estuaire et le nord du golfe Saint-Laurent (2004-2009). Rapp. tech. can. sci. hal. aquat. 2866 : xi + 243 p.

Nozères C., D. Archambault et R. Miller. 2014. Photo-catalogue d'invertébrés de l'estuaire et du nord du golfe du Saint-Laurent des relevés au chalut (2005-2013). Rapp. manus. can. sci. halieut. aquat. 3035 : iv + 222 p.

SLGO. 2016. St. Lawrence Global Observatory. (Accessed November 30th 2016).

R Development Core Team. 2011. R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. (Accessed November 30th 2016).

FIGURES

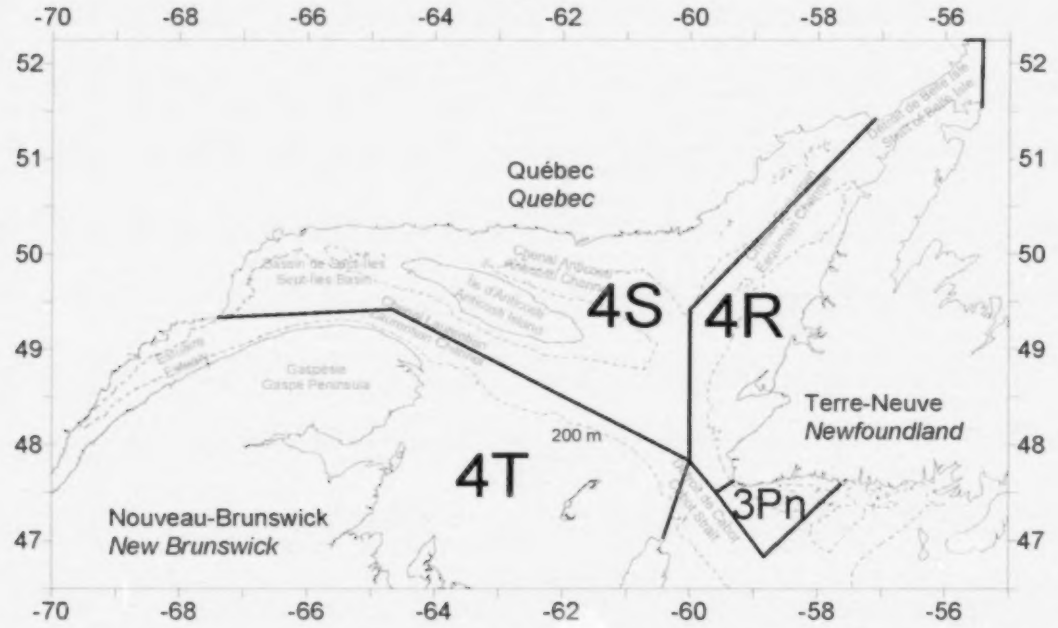

Figure 1. NAFO Divisions of the Estuary and Gulf of St. Lawrence and names of locations mentioned in the text.

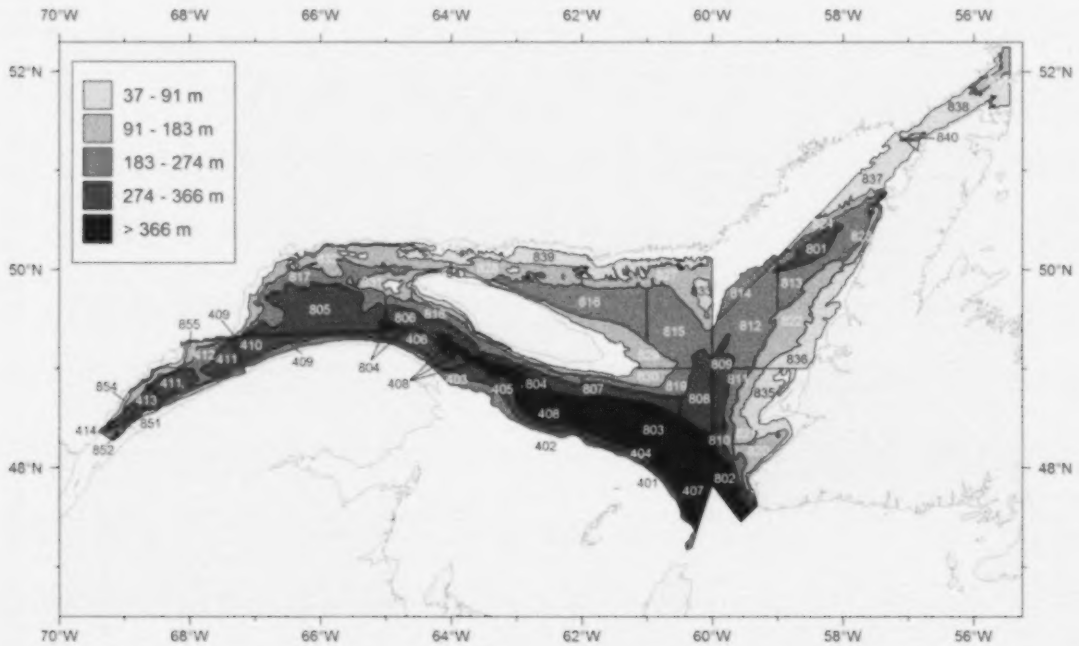

Figure 2. Stratification scheme used for the groundfish and shrimp research survey in the Estuary and northern Gulf of St. Lawrence.

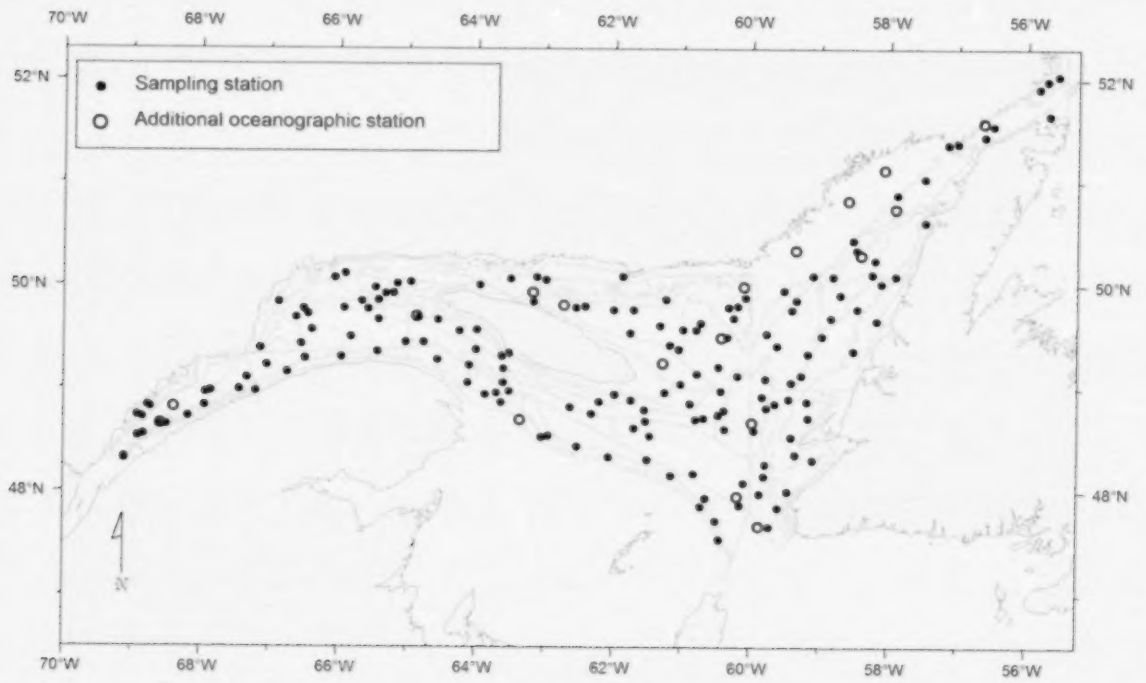

Figure 3. Locations of successful sampling stations (trawl and oceanography) and additional oceanographic stations for the 2016 survey.

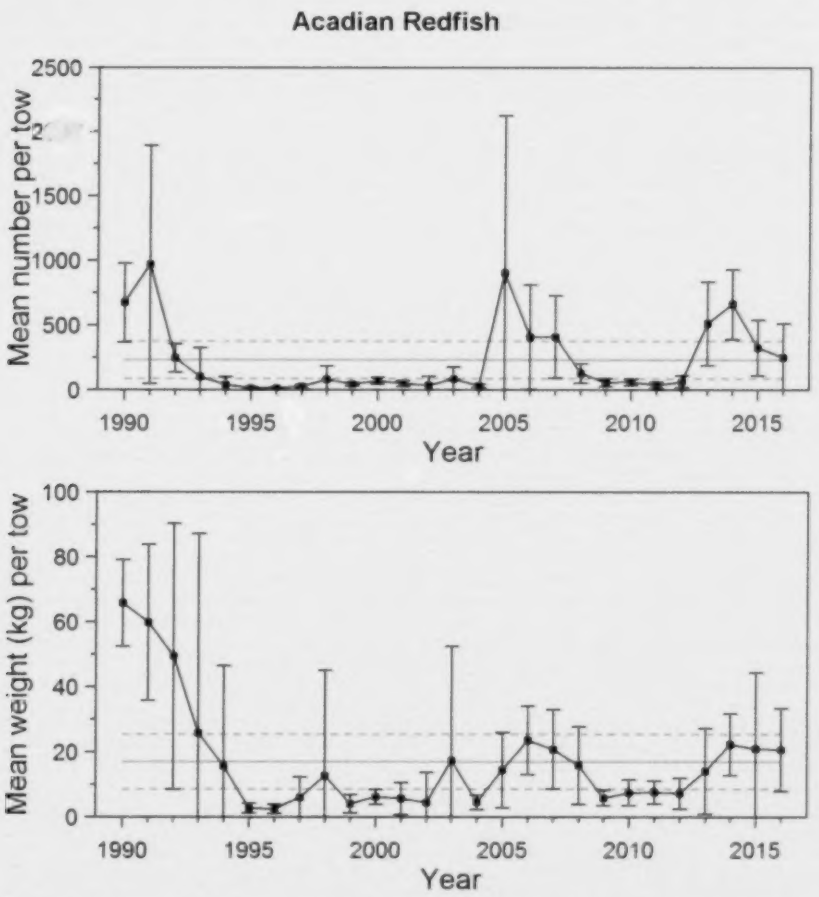

Figure 4. Mean numbers and mean weights per 15 minutes tow observed during the survey for Acadian Redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

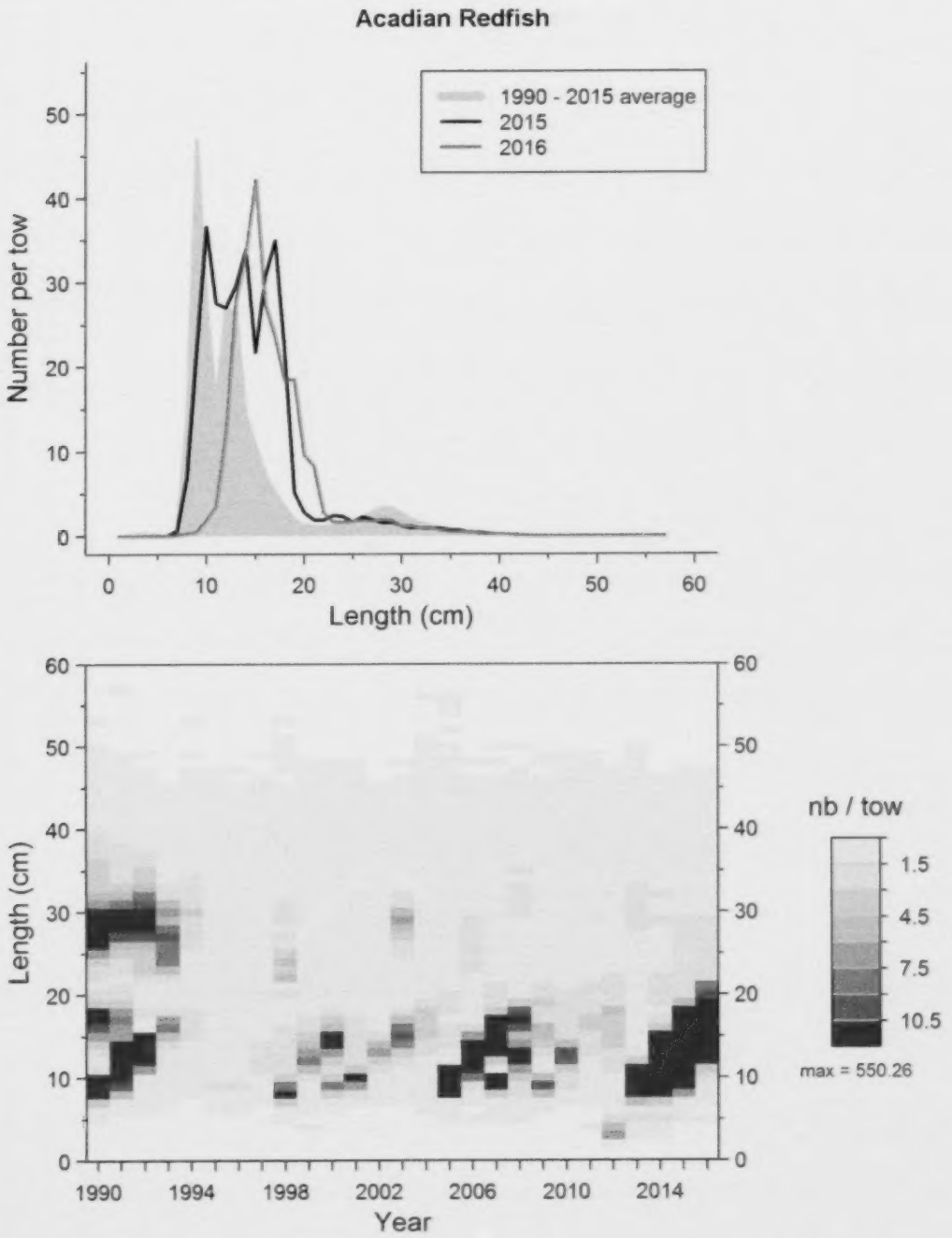

Figure 5. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Acadian Redfish in 4RST.

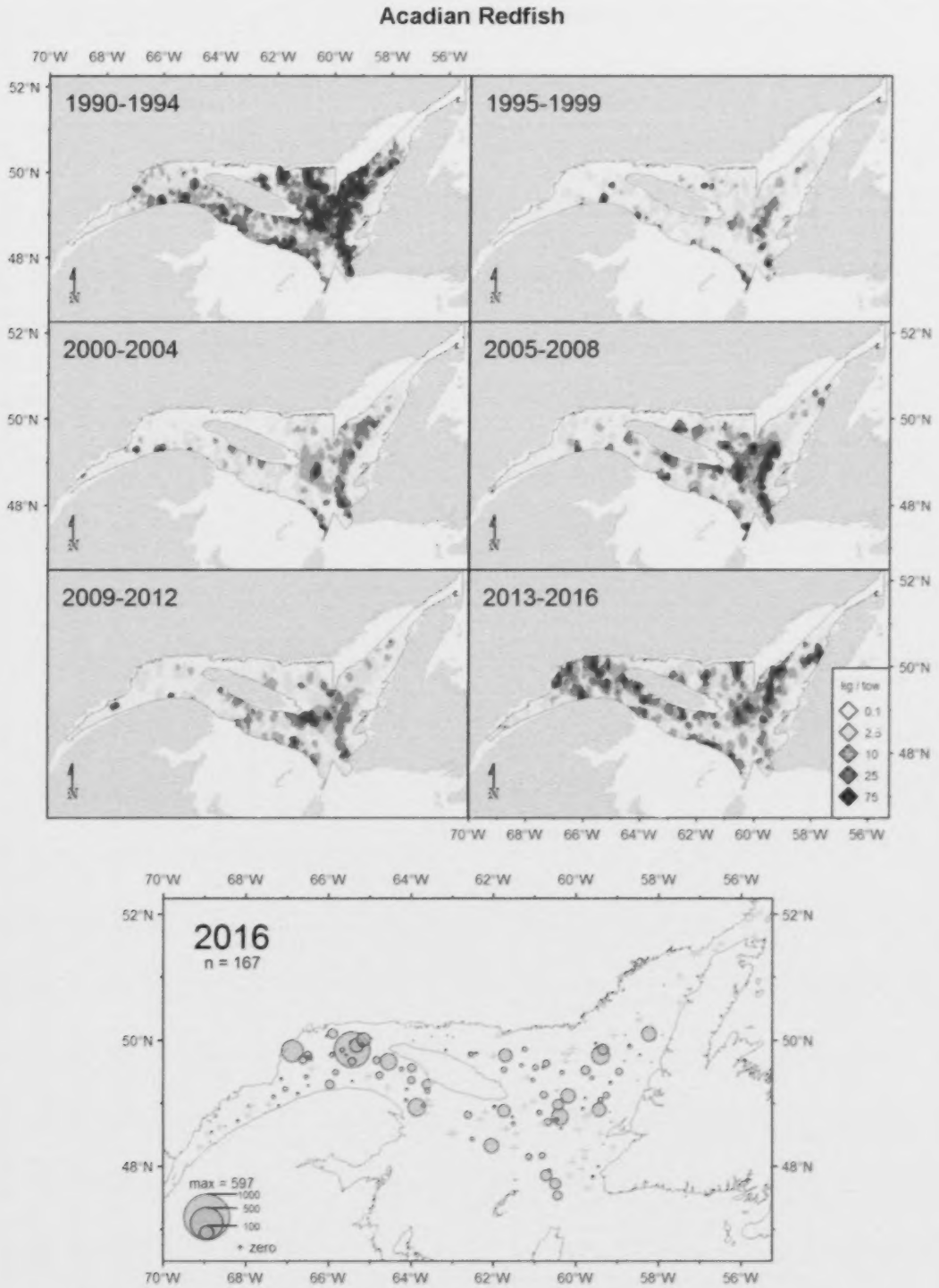

Figure 6. Acadian Redfish catch rates (kg/15 minutes tow) distribution.

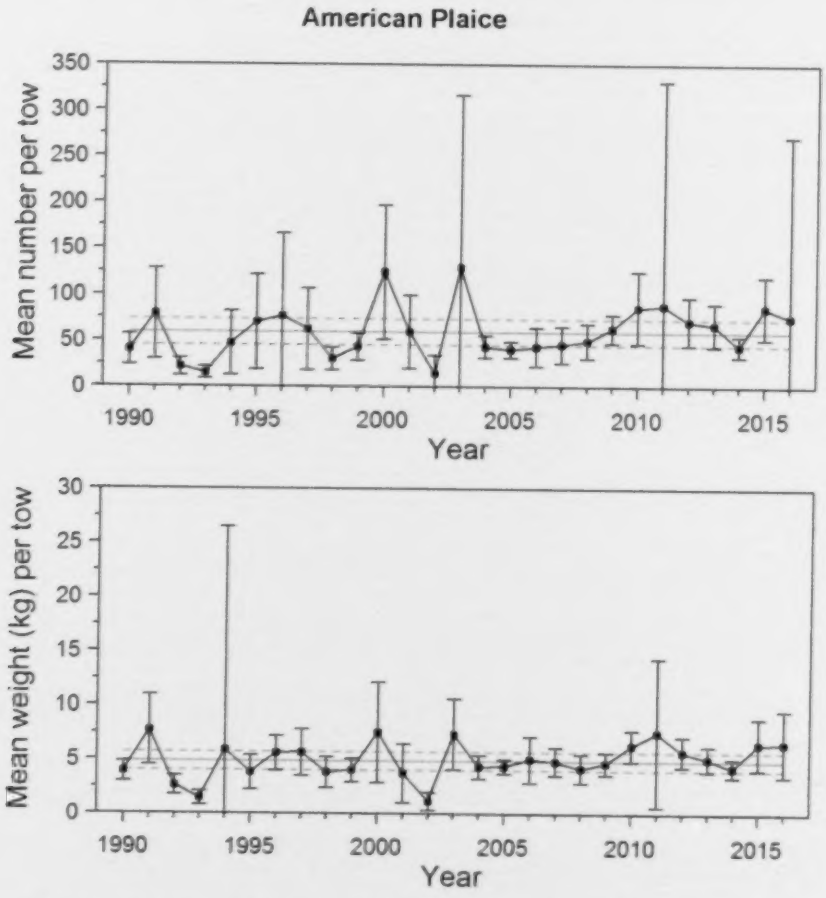

Figure 7. Mean numbers and mean weights per 15 minutes tow observed during the survey for American Plaice in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

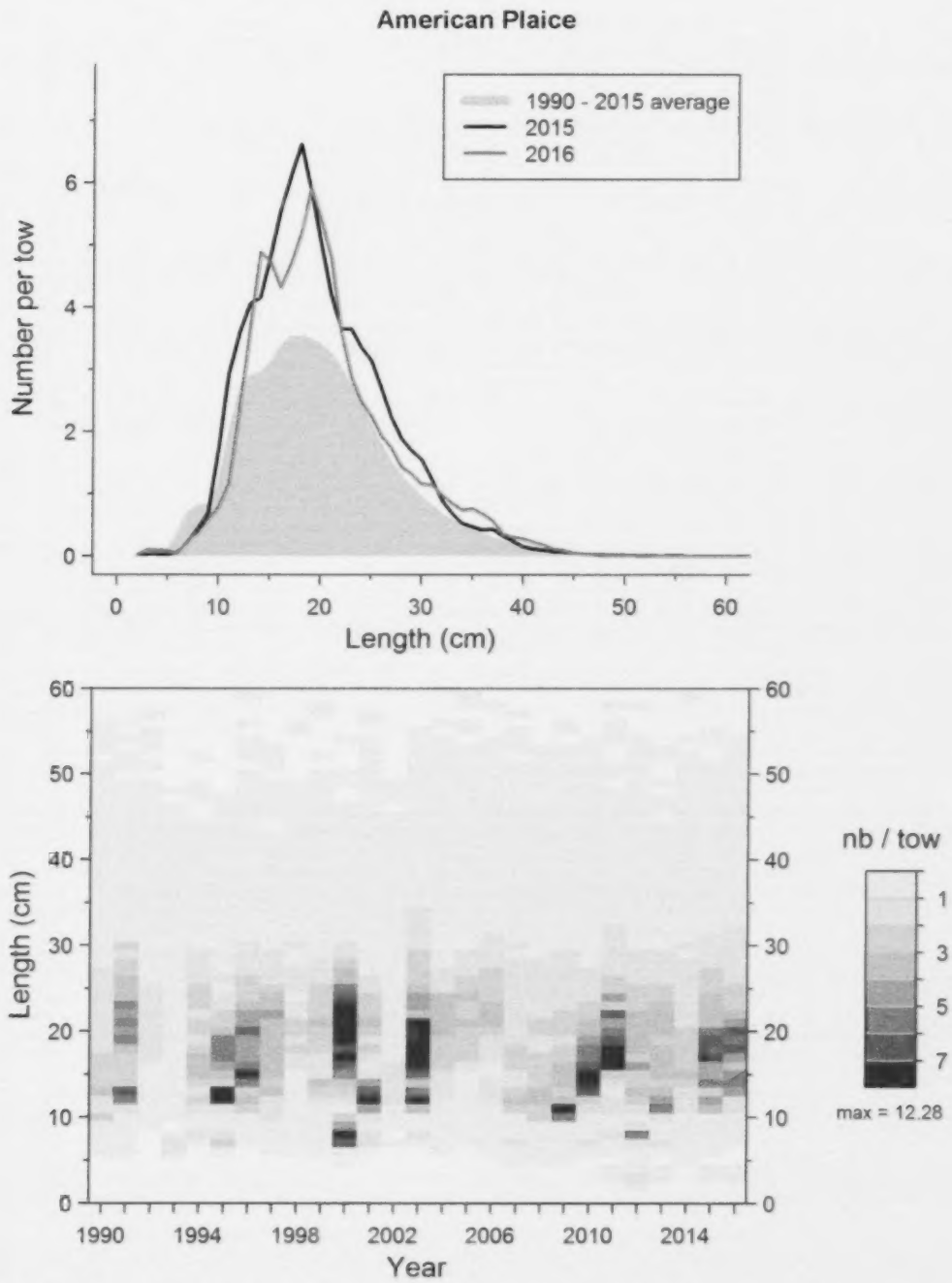

Figure 8. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for American Plaice in 4RST.

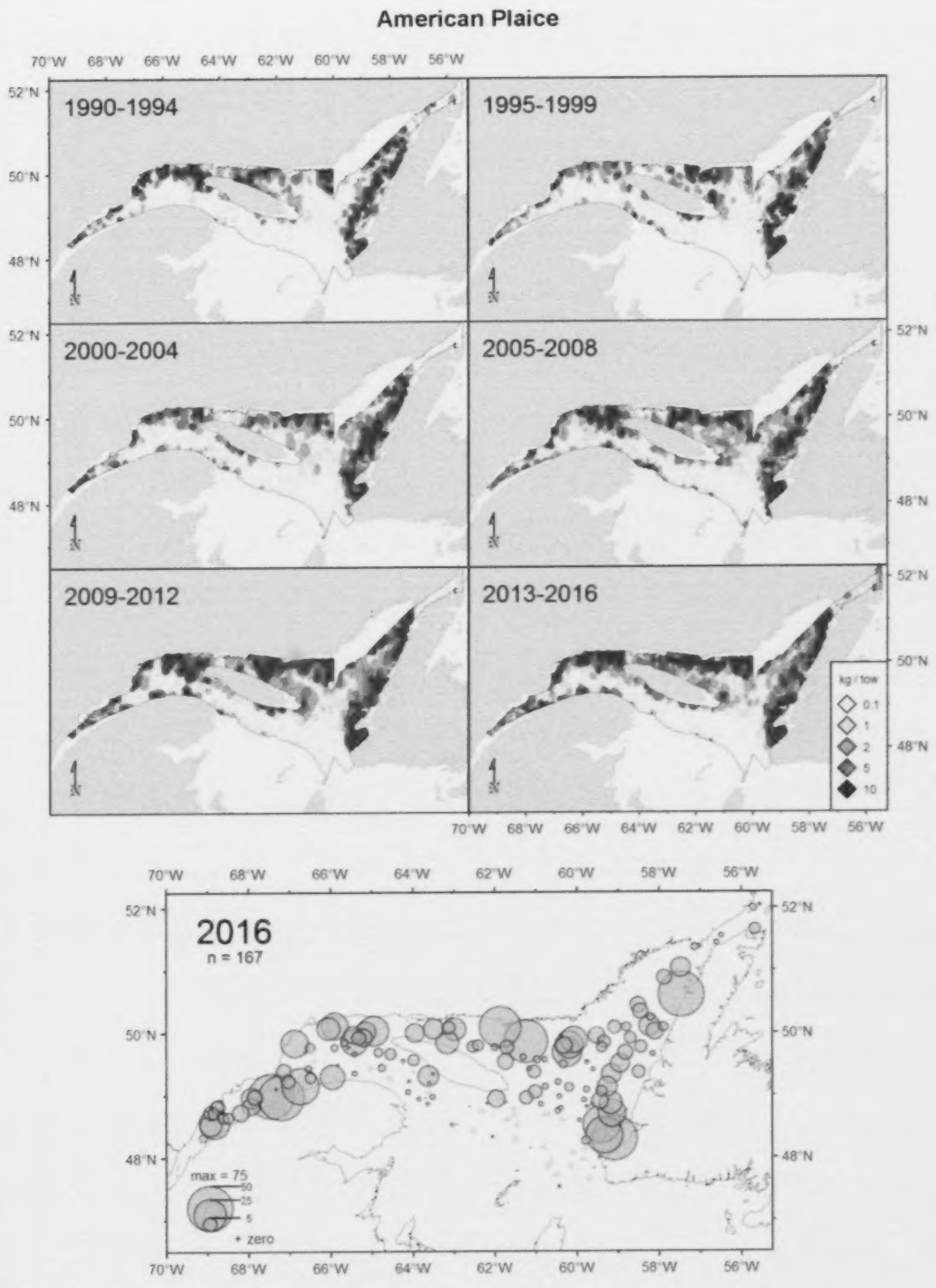

Figure 9. American Plaice catch rates (kg/15 minutes tow) distribution.

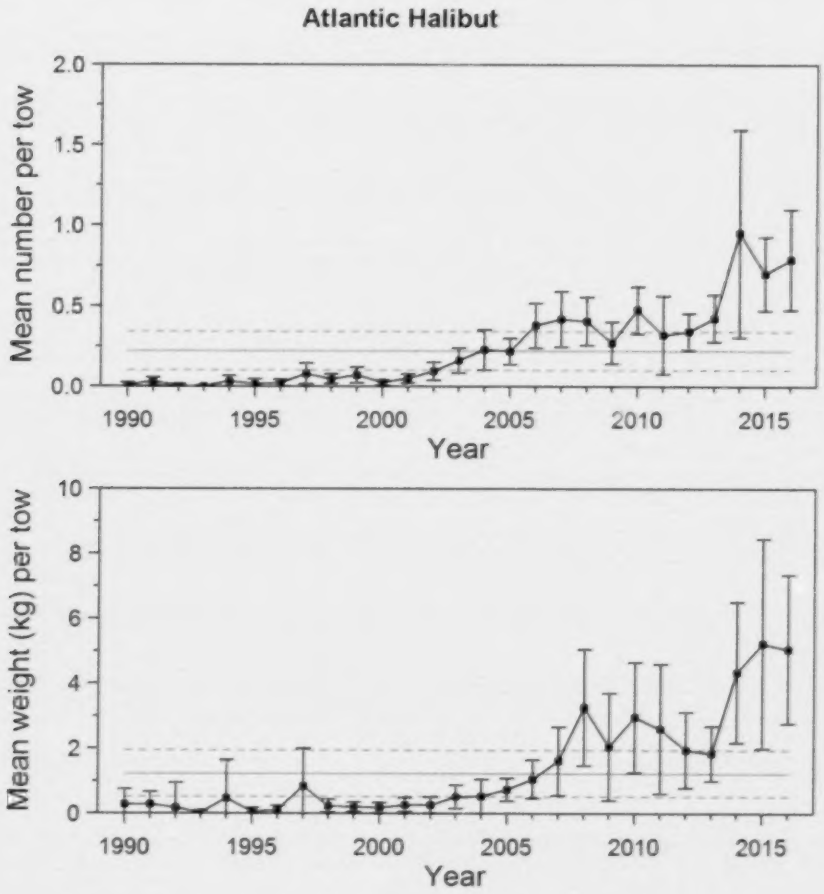

Figure 10. Mean numbers and mean weights per 15 minutes tow observed during the survey for Atlantic Halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

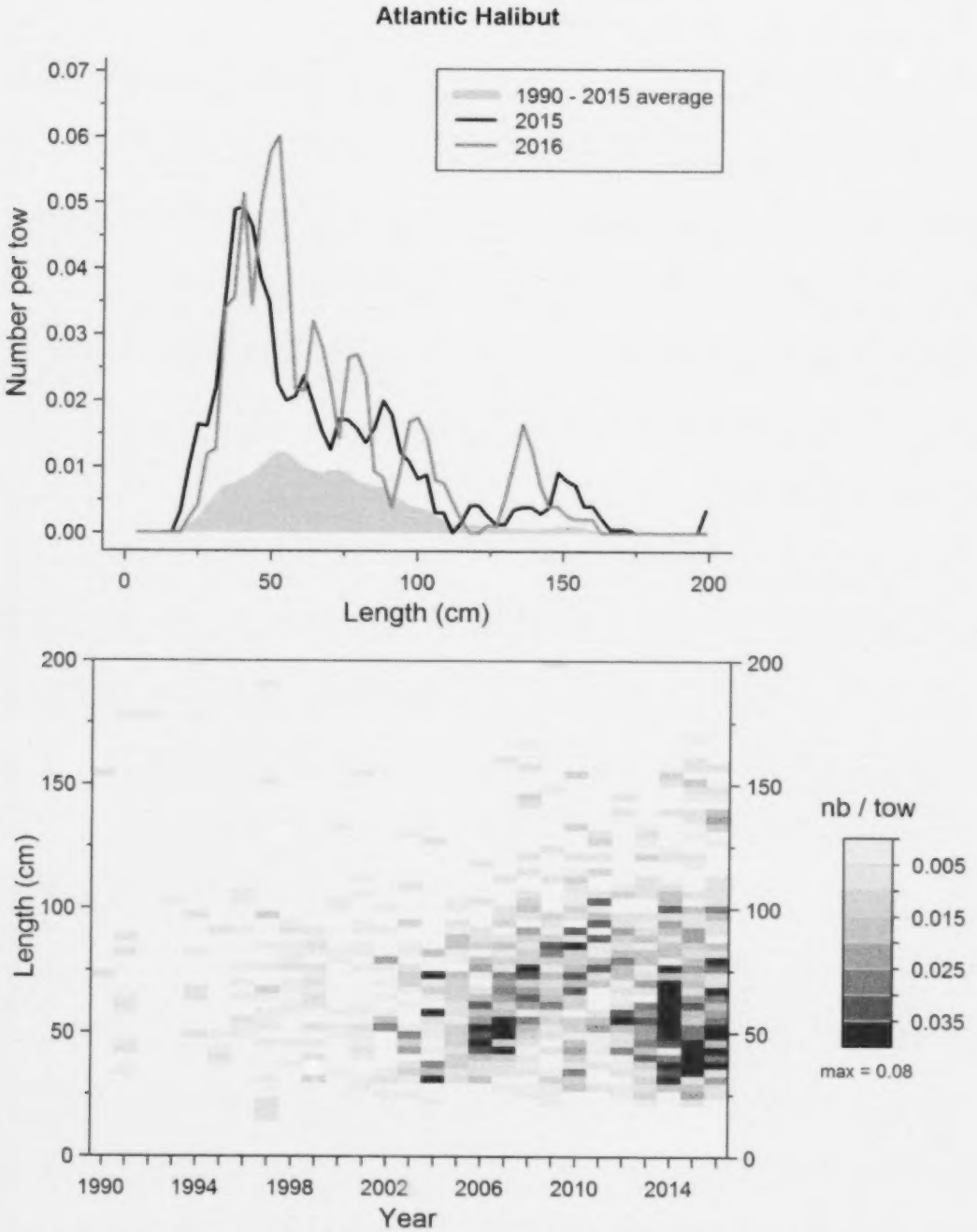

Figure 11. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Atlantic Halibut in 4RST.

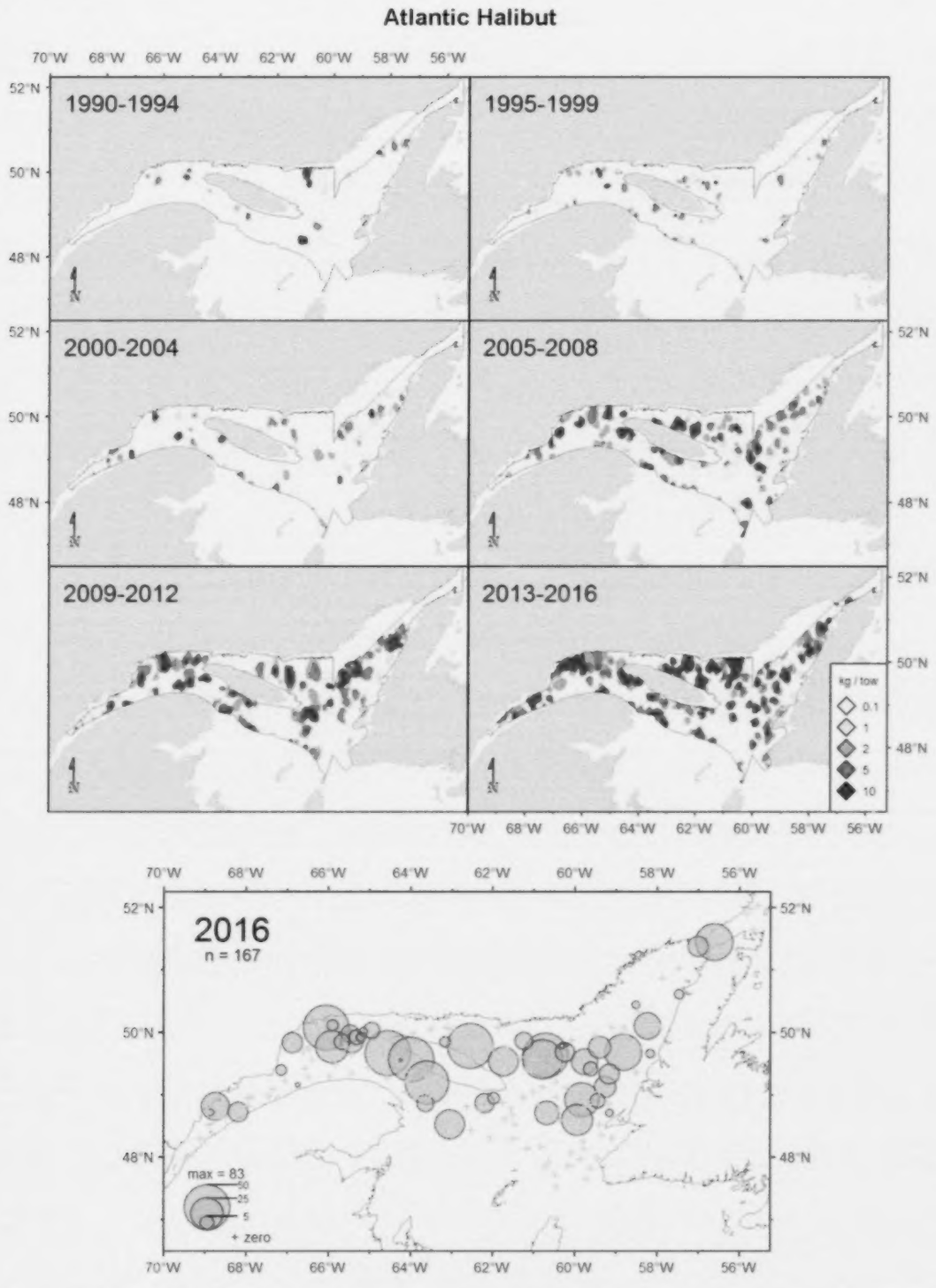

Figure 12. Atlantic Halibut catch rates (kg/15 minutes tow) distribution.

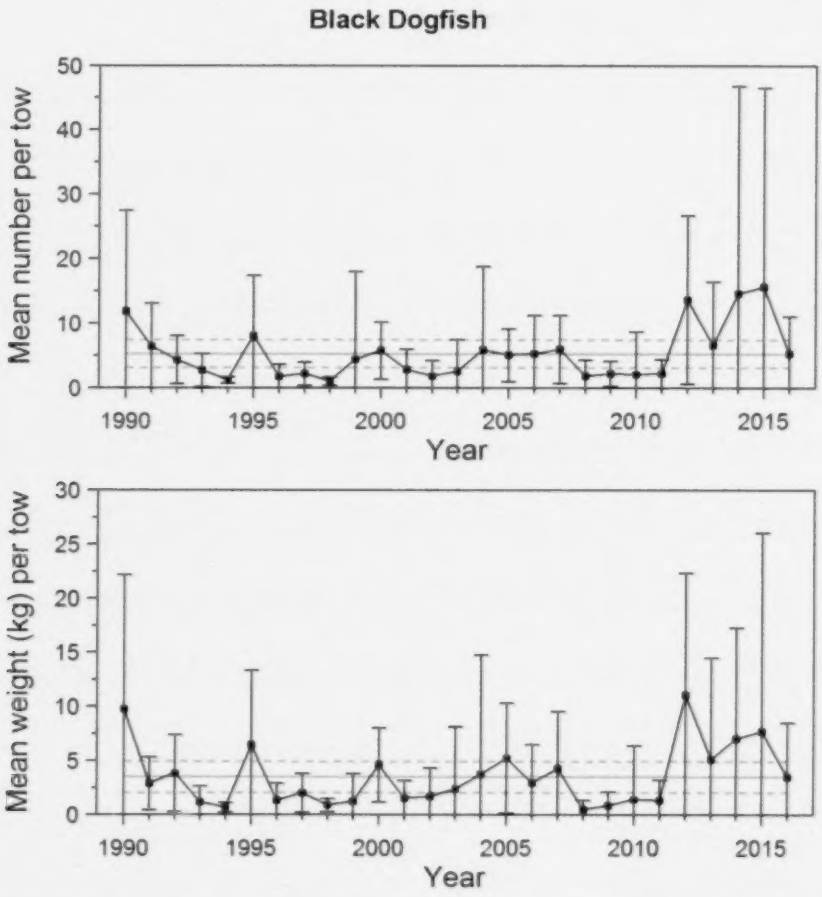

Figure 13. Mean numbers and mean weights per 15 minutes tow observed during the survey for Black Dogfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

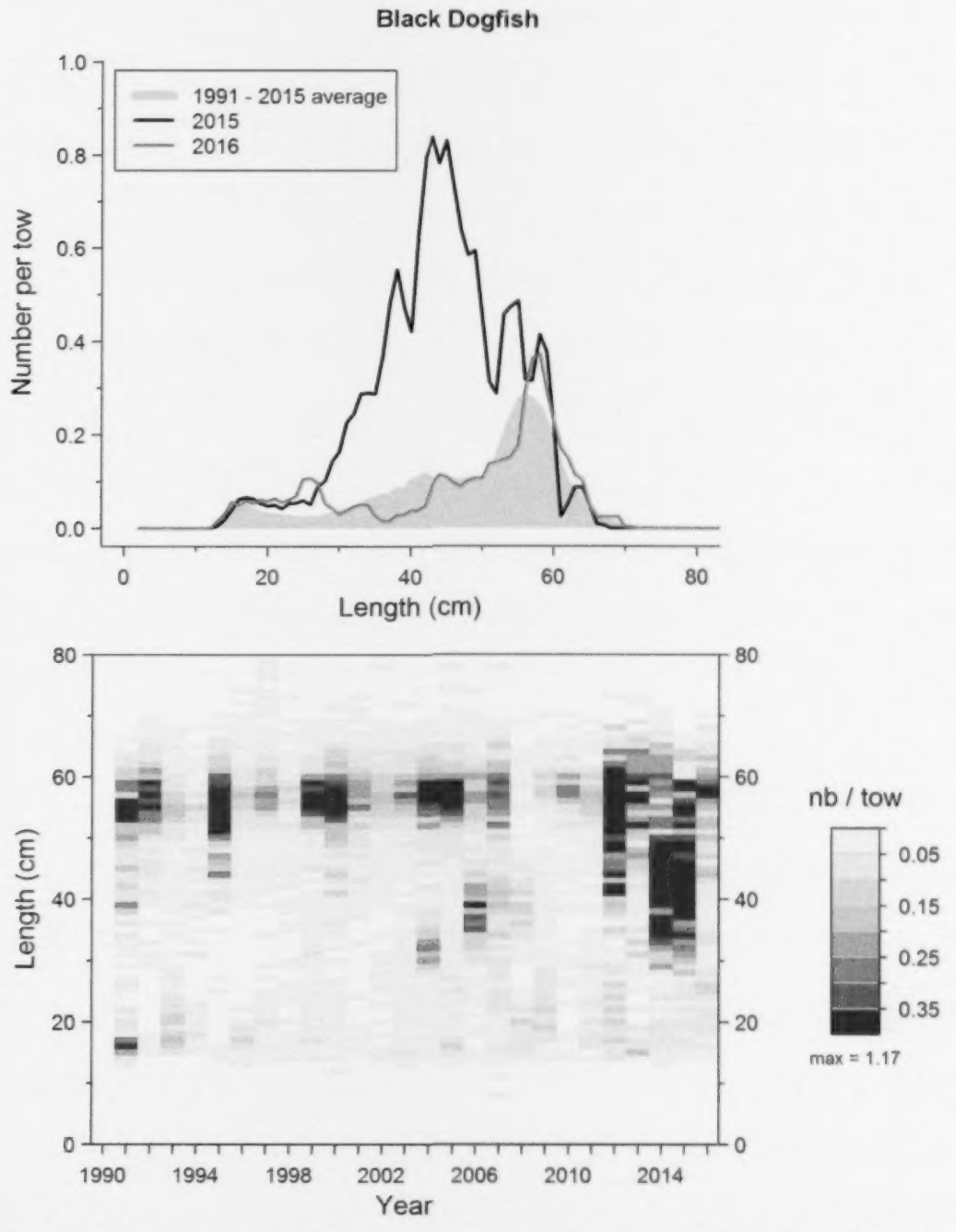

Figure 14. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Black Dogfish in 4RST.

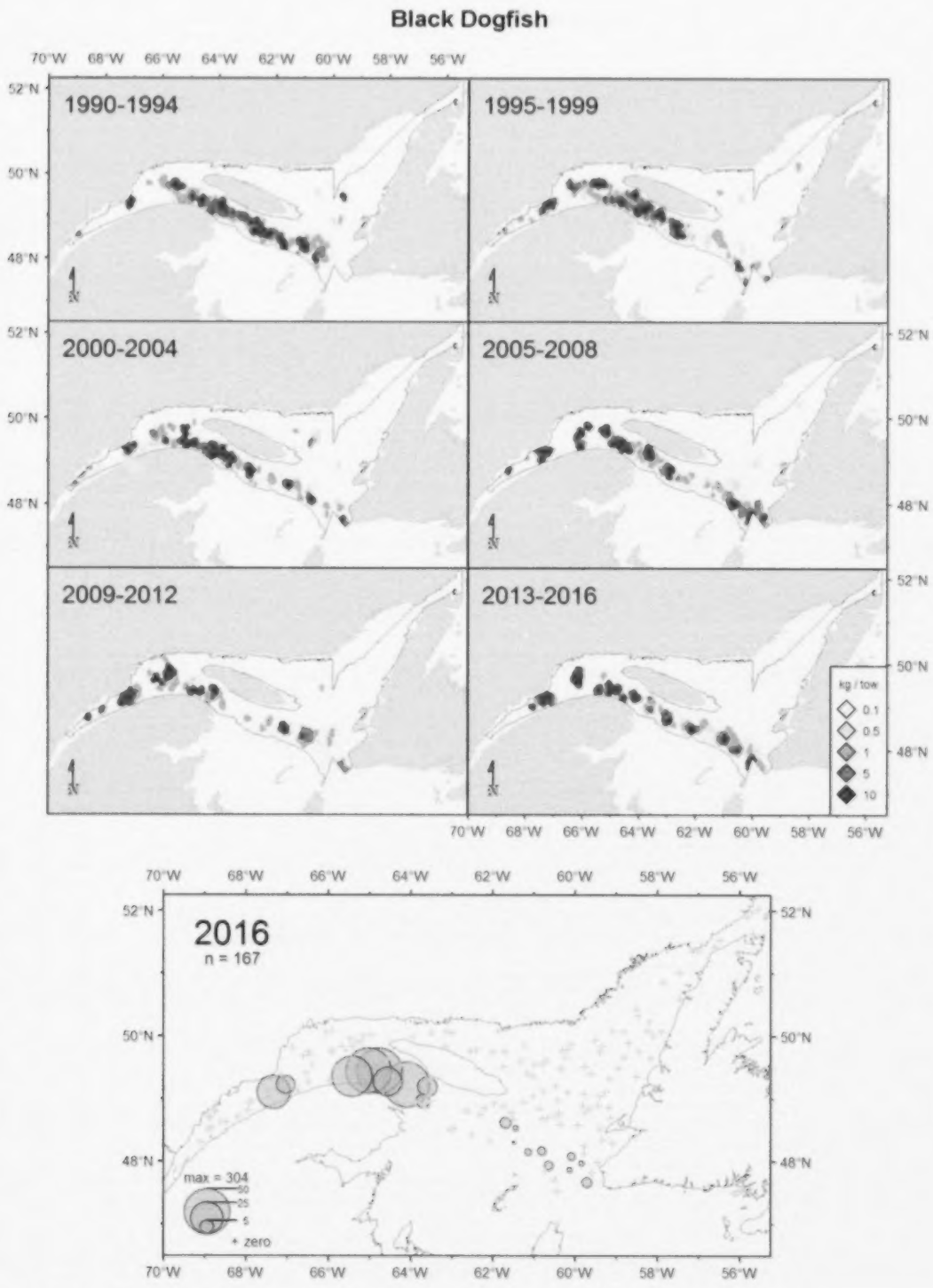

Figure 15. Black Dogfish catch rates (kg/15 minutes tow) distribution.

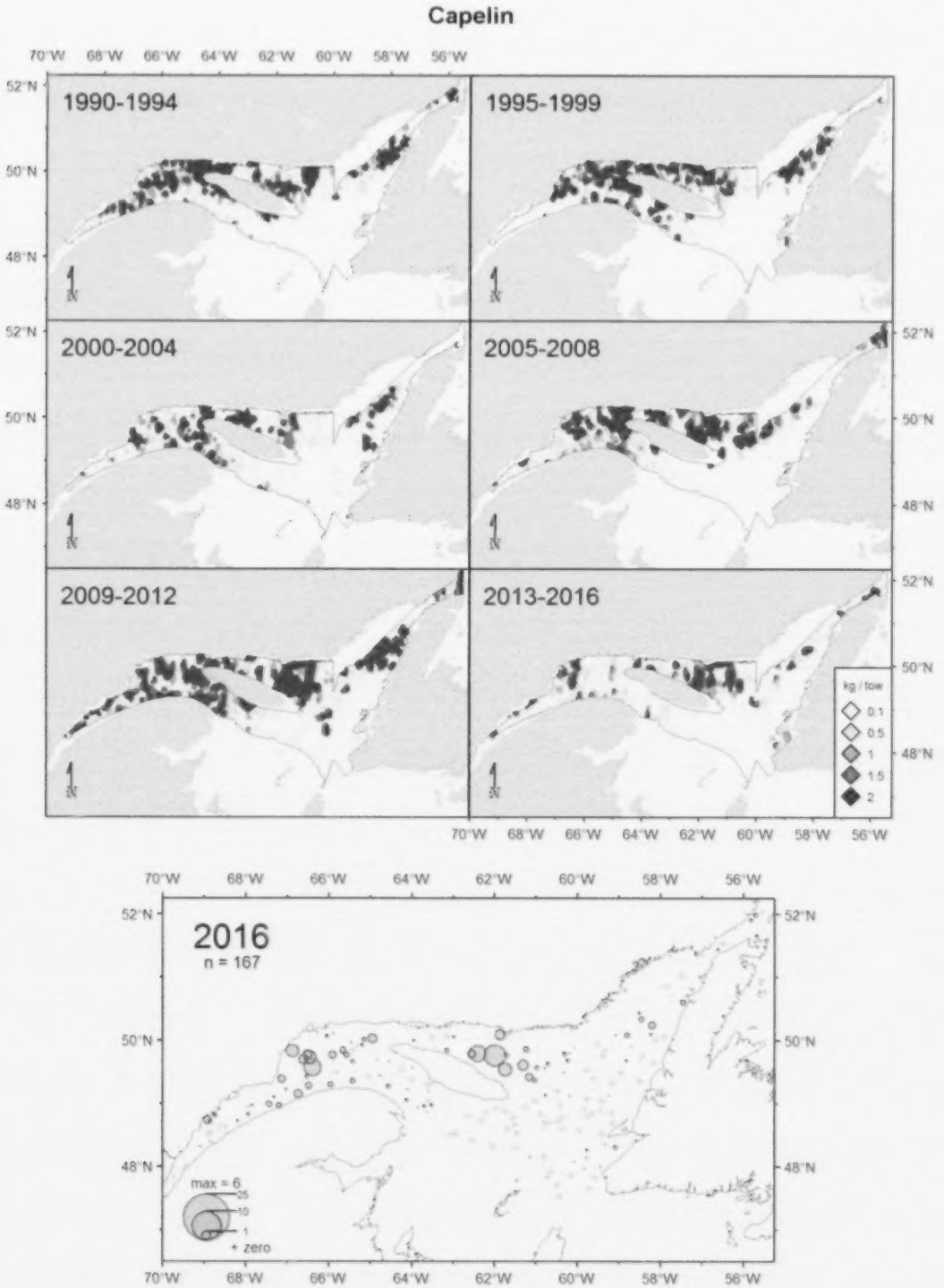

Figure 16. Capelin catch rates (kg/15 minutes tow) distribution.

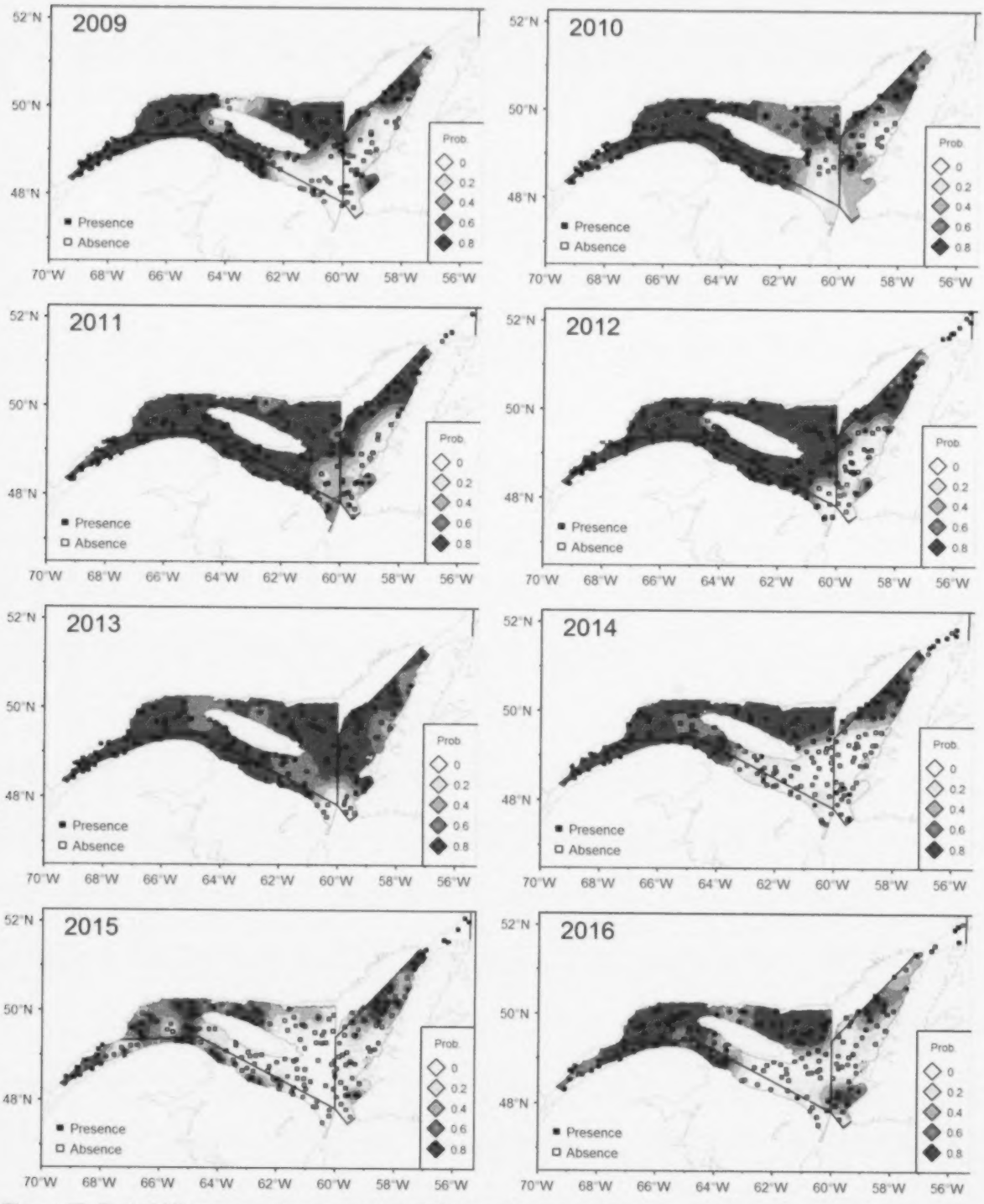

Figure 17. Probabilities areas (%) associated with the presence of Capelin.

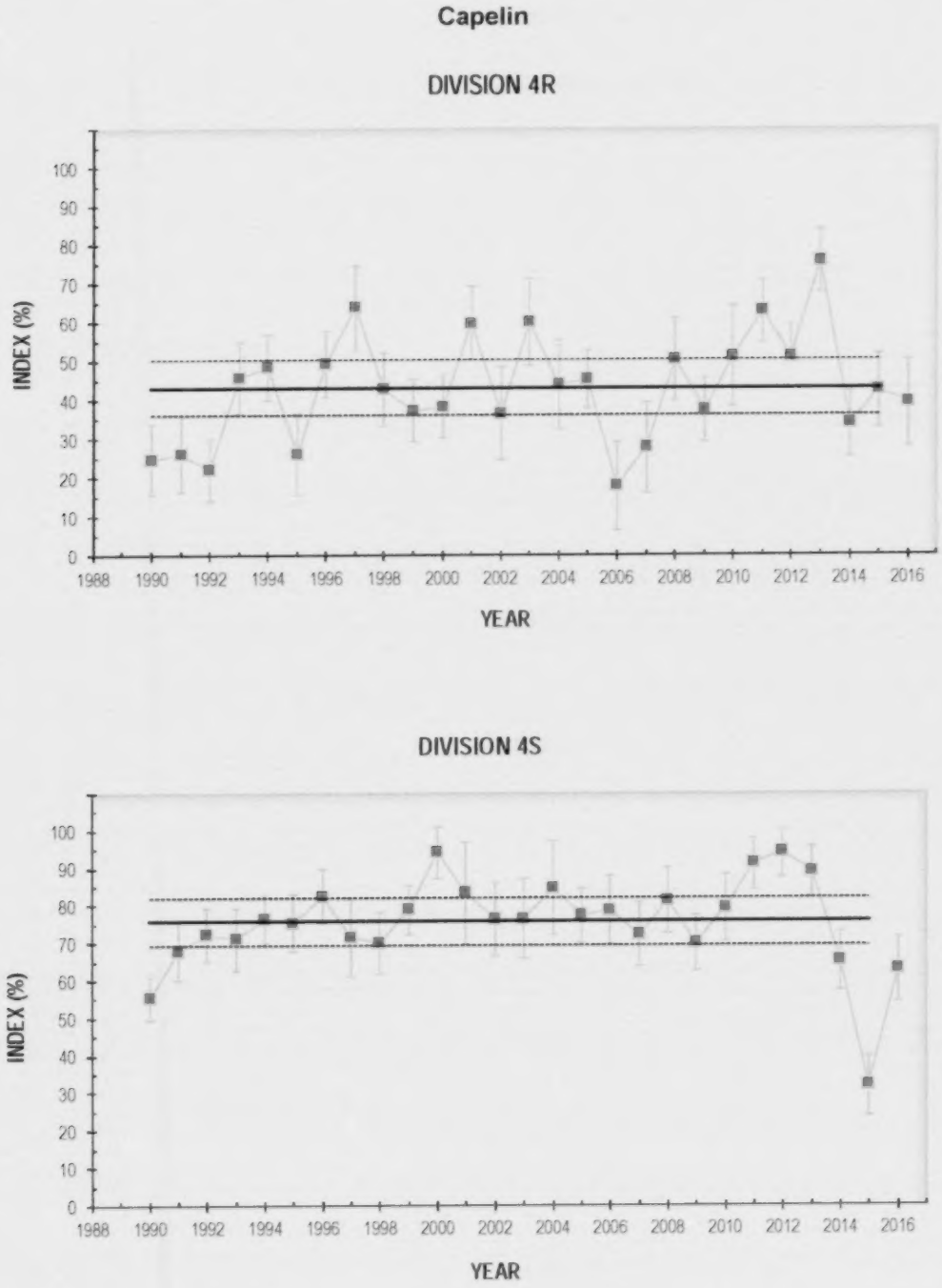

Figure 18. Mean probabilities of finding Capelin in NAFO Divisions 4R and 4S. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

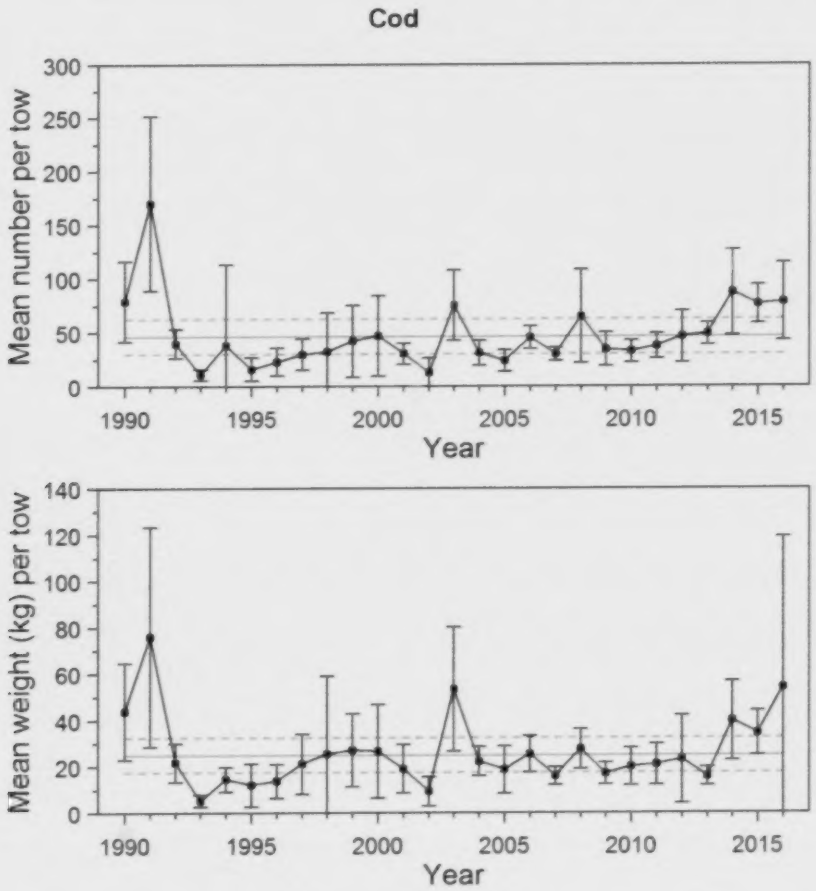

Figure 19. Mean numbers and mean weights per 15 minutes tow observed during the survey for Cod in 4RS. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

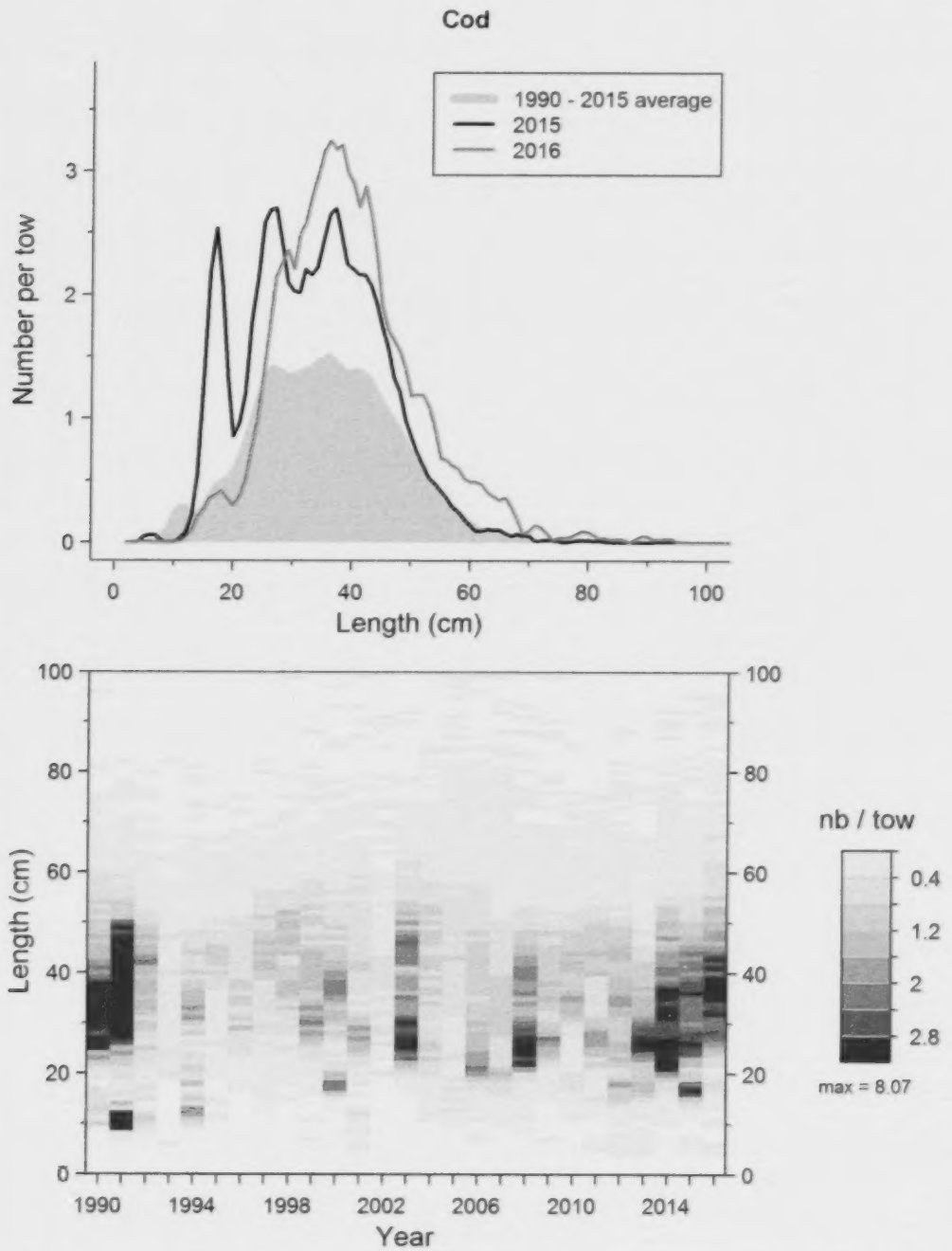

Figure 20. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Cod in 4RS.

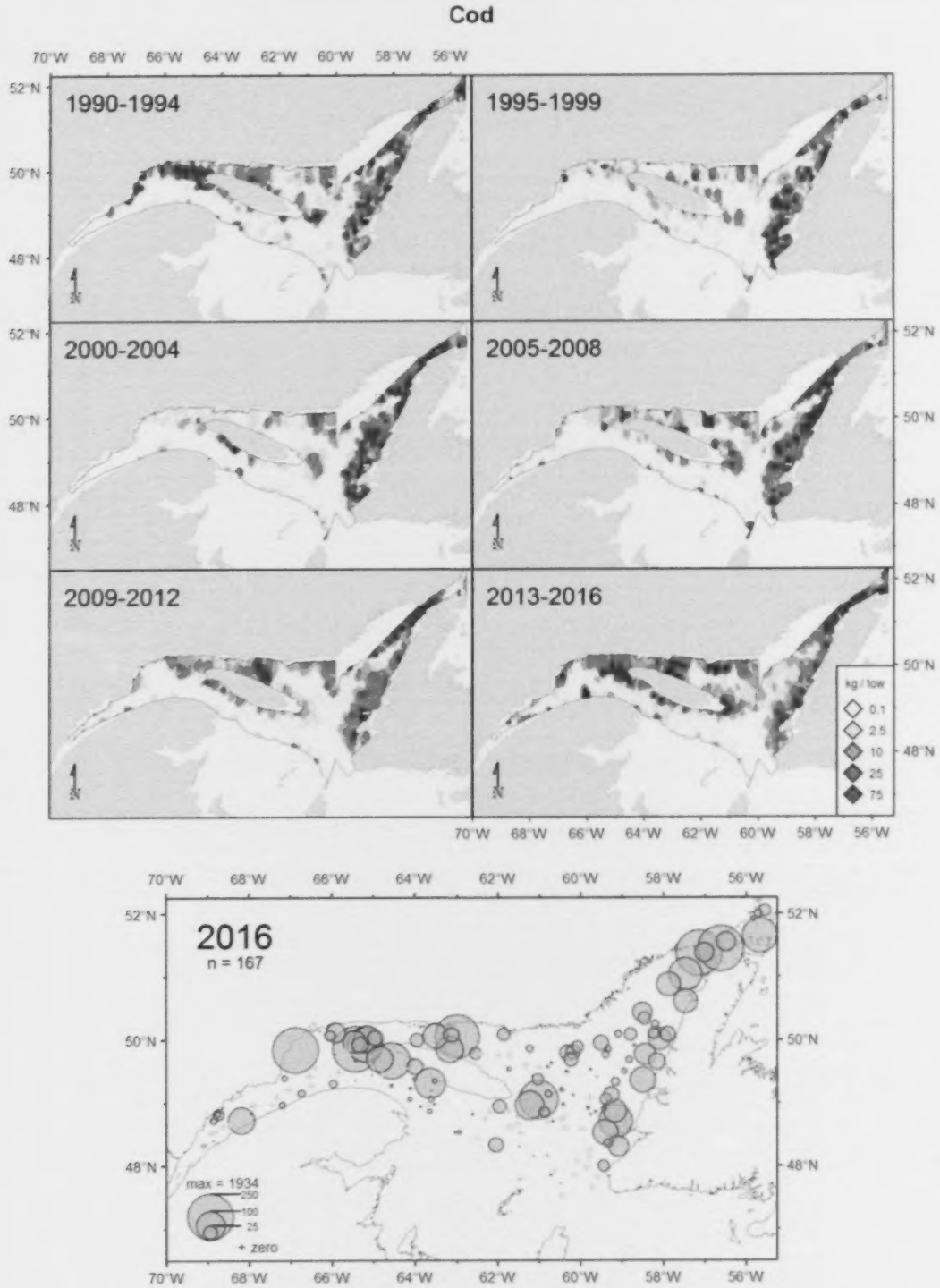

Figure 21. Cod catch rates (kg/15 minutes tow) distribution.

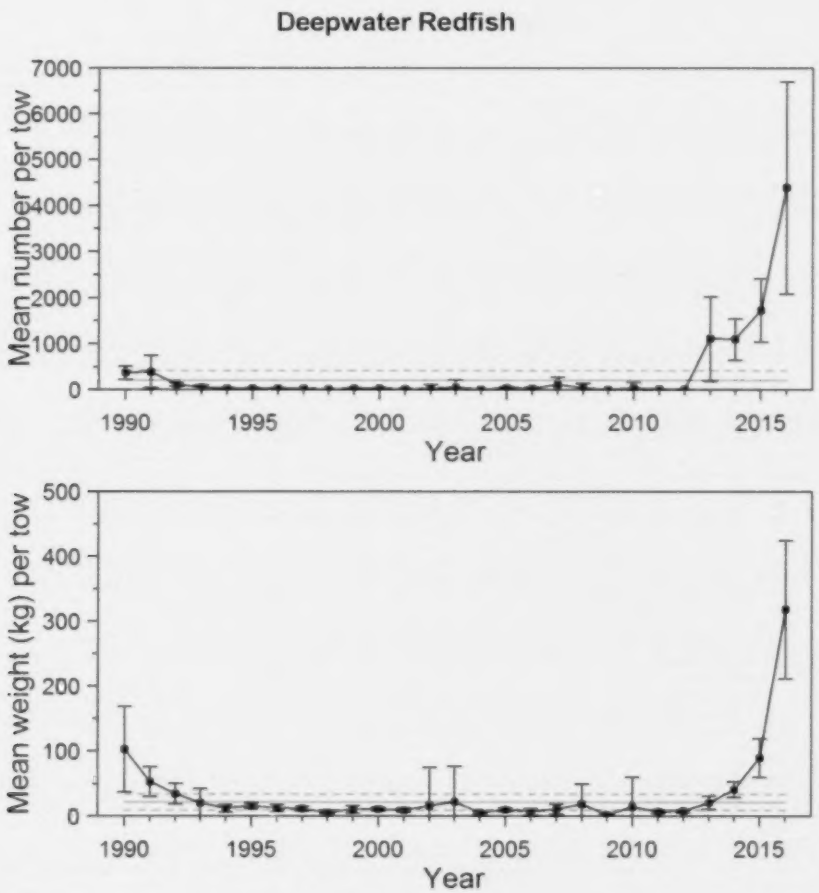

Figure 22. Mean numbers and mean weights per 15 minutes tow observed during the survey for Deepwater Redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

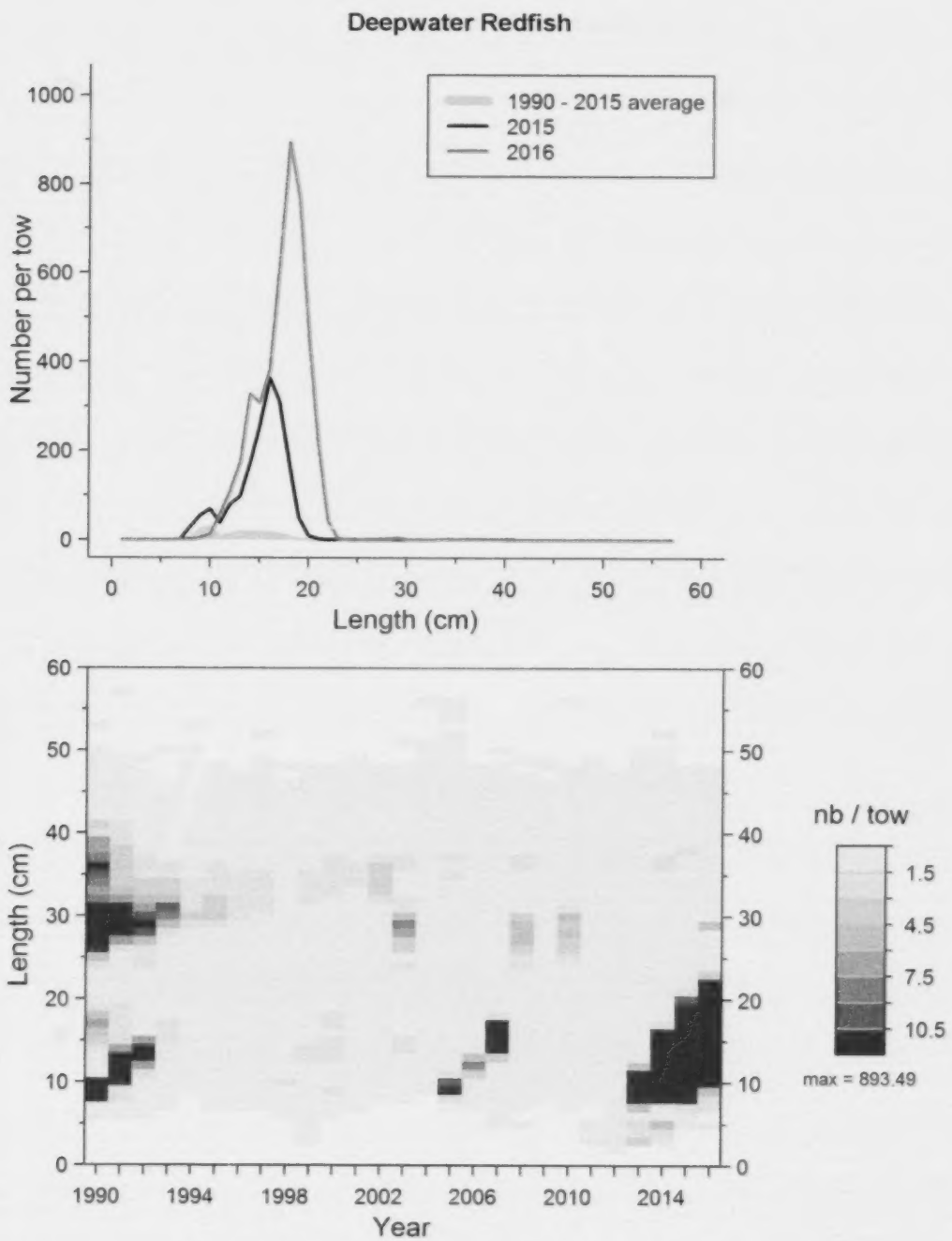

Figure 23. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Deepwater Redfish in 4RST.

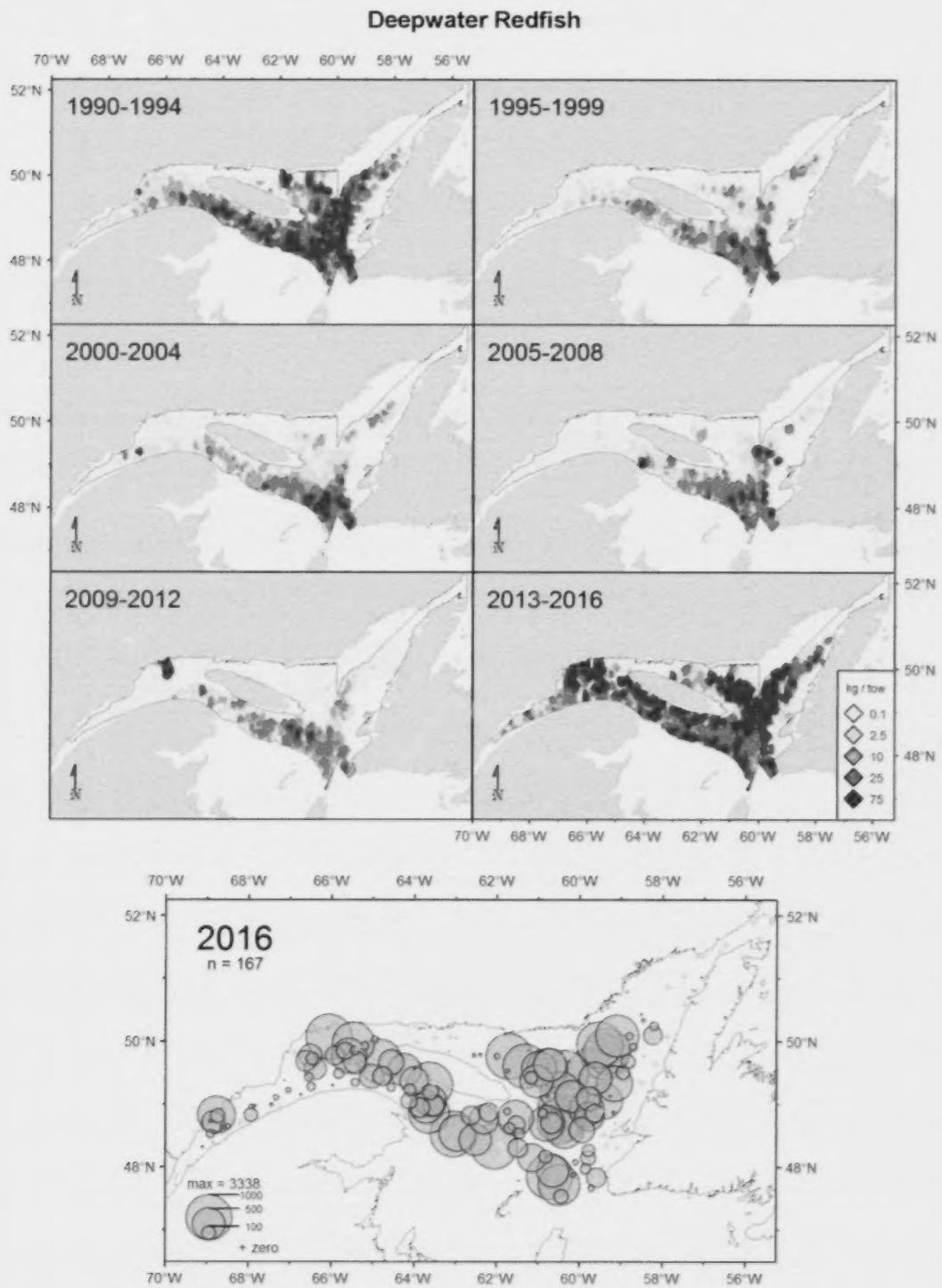

Figure 24. Deepwater Redfish catch rates (kg/15 minutes tow) distribution.

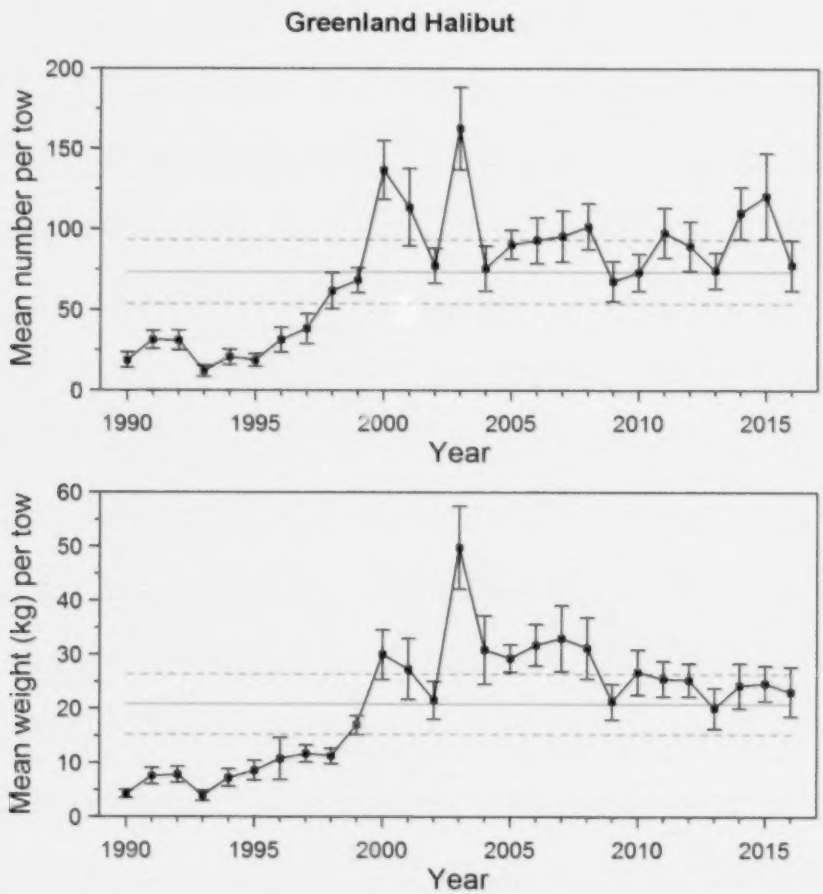

Figure 25. Mean numbers and mean weights per 15 minutes tow observed during the survey for Greenland Halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

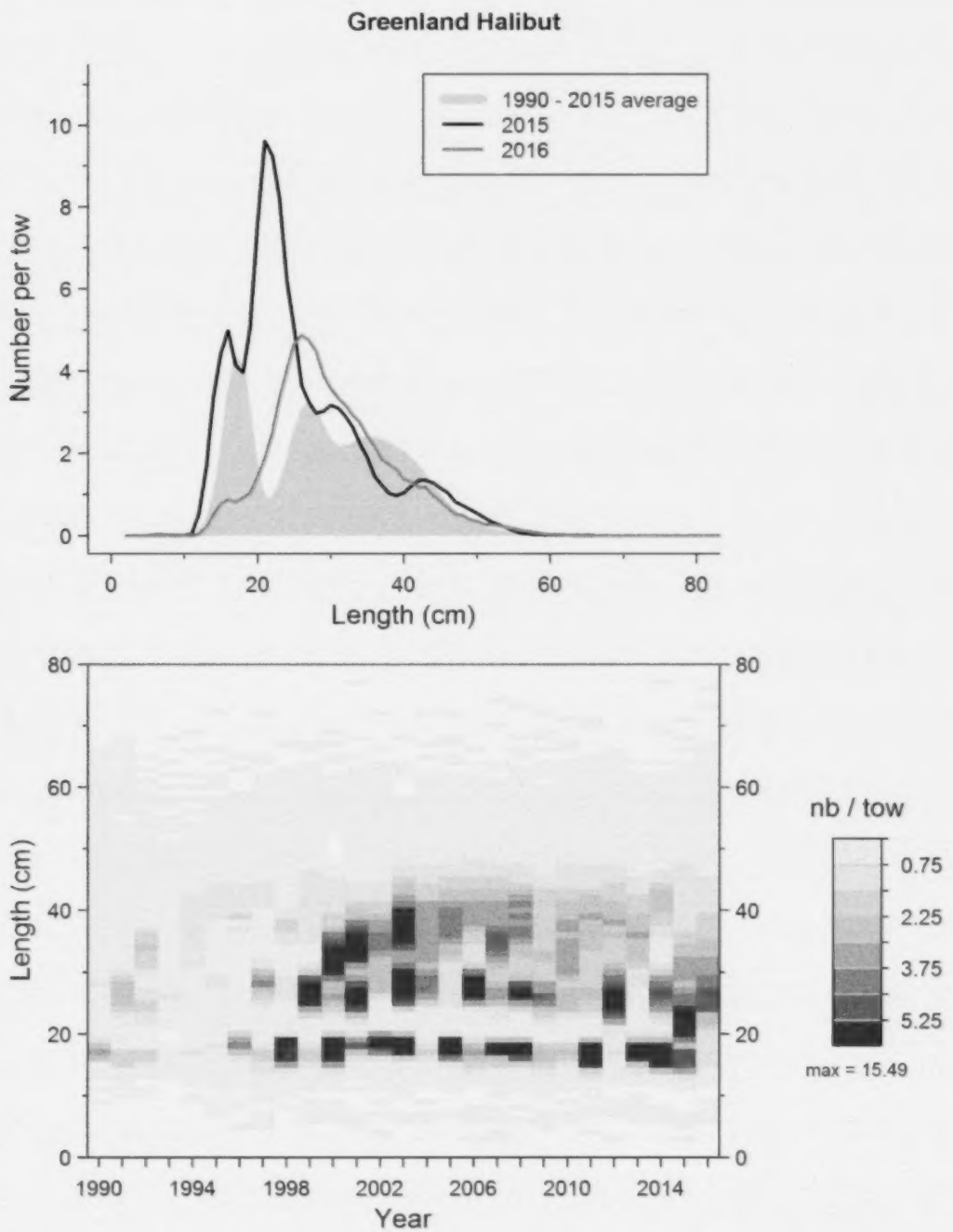

Figure 26. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Greenland Halibut in 4RST.

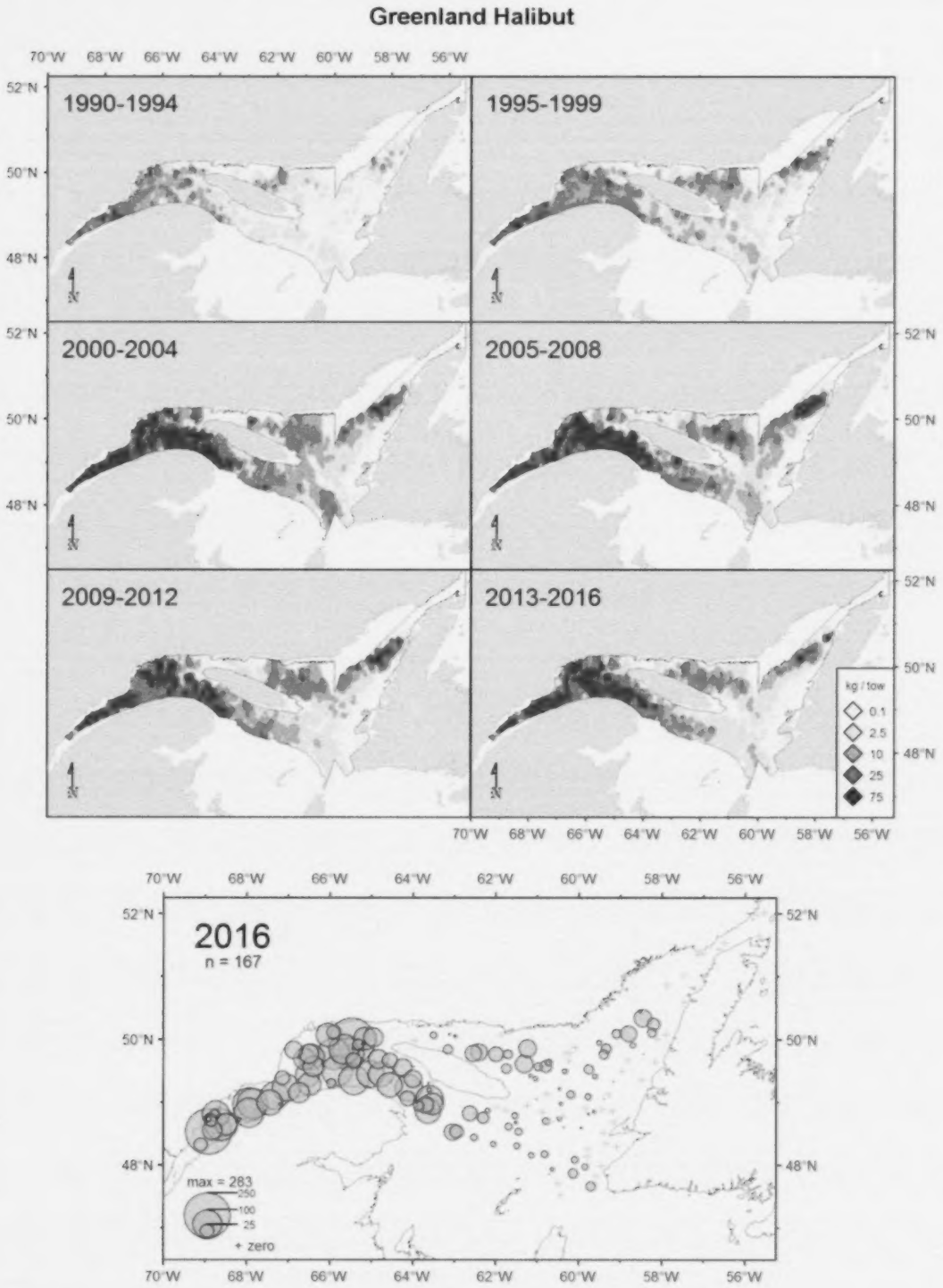

Figure 27. Greenland Halibut catch rates (kg/15 minutes tow) distribution.

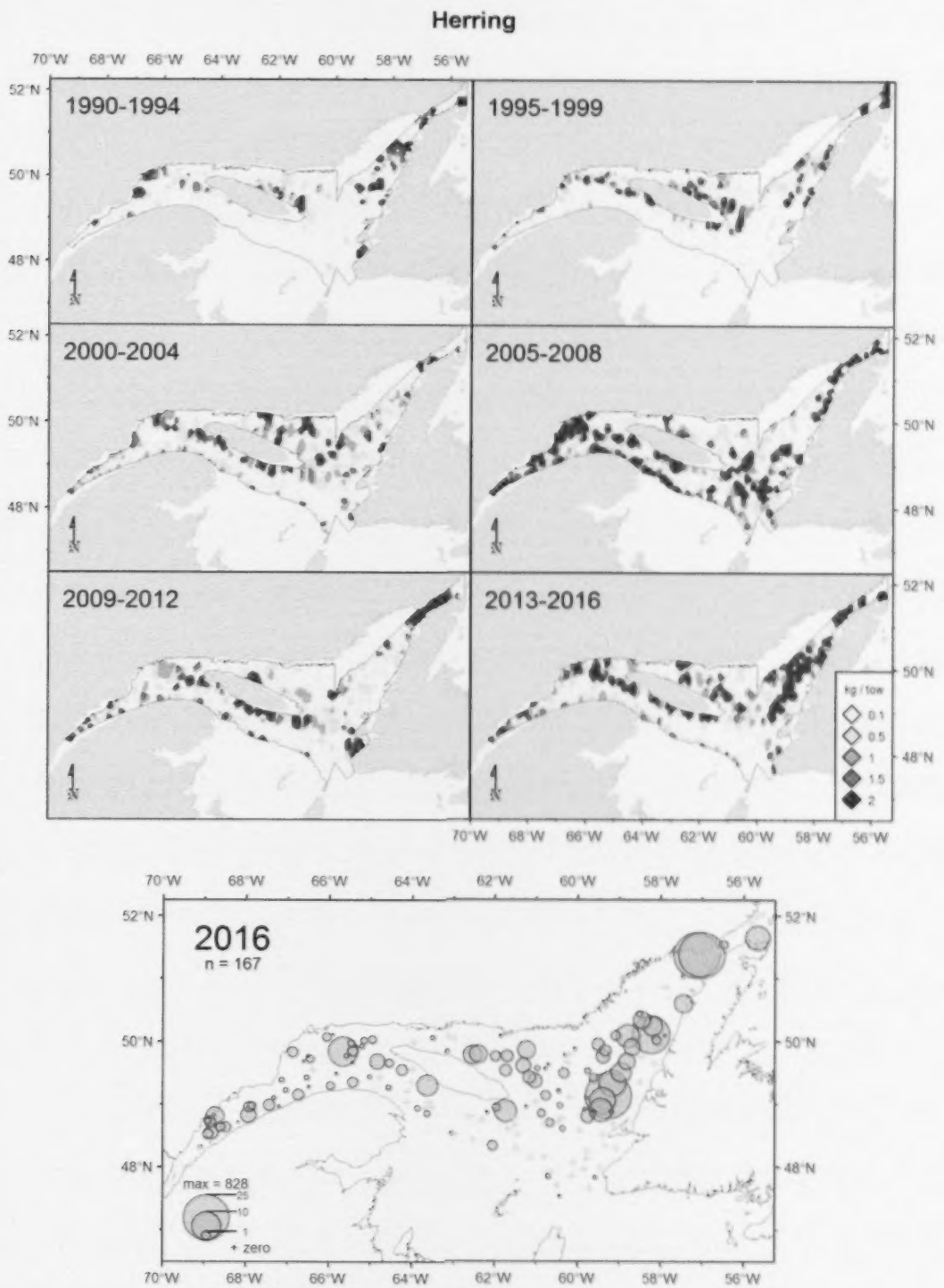

Figure 28. Herring catch rates (kg/15 minutes tow) distribution.

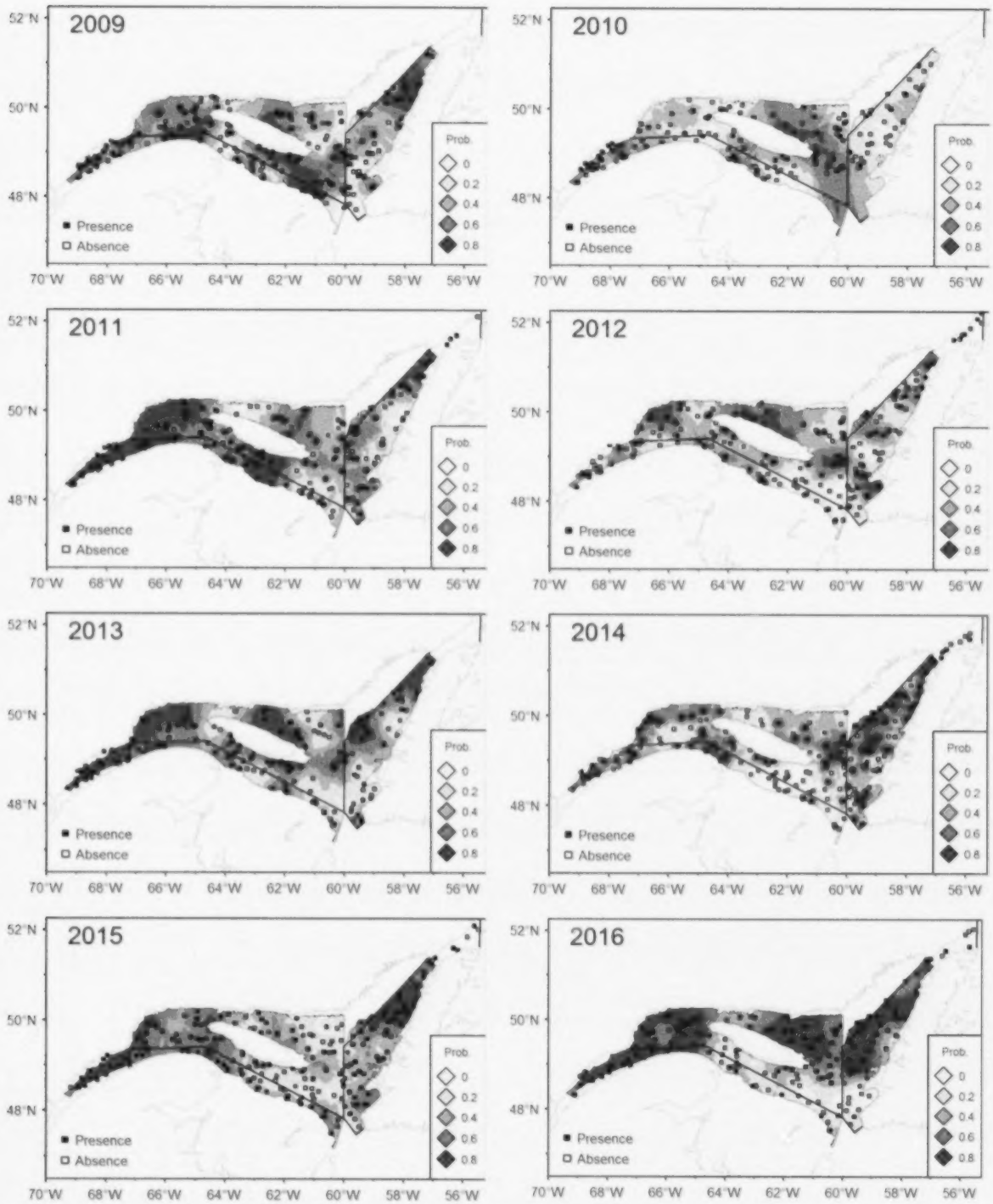

Figure 29. Probabilities areas (%) associated with the presence of Herring.

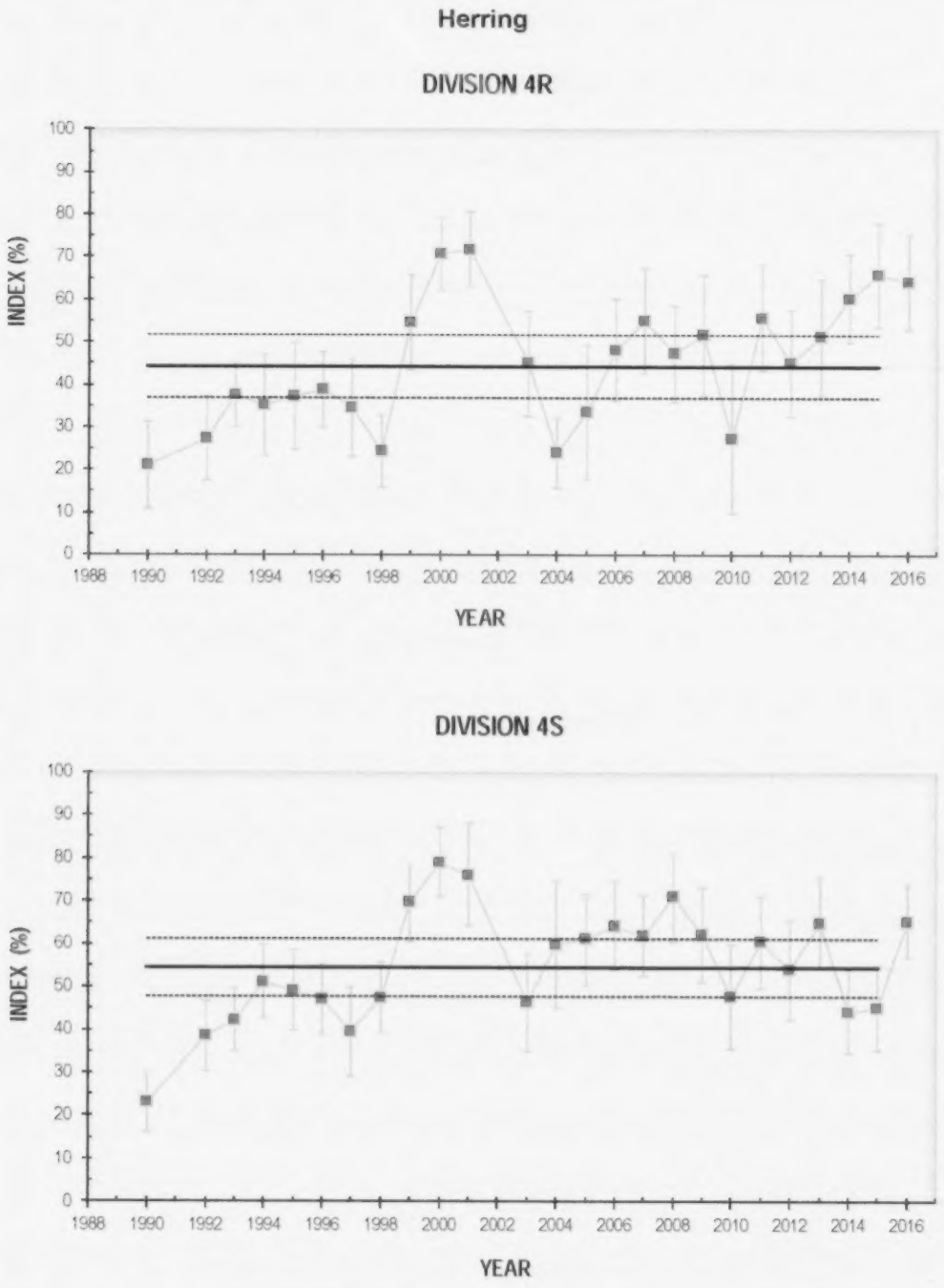

Figure 30. Mean probabilities of finding Herring in NAFO Divisions 4R and 4S. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

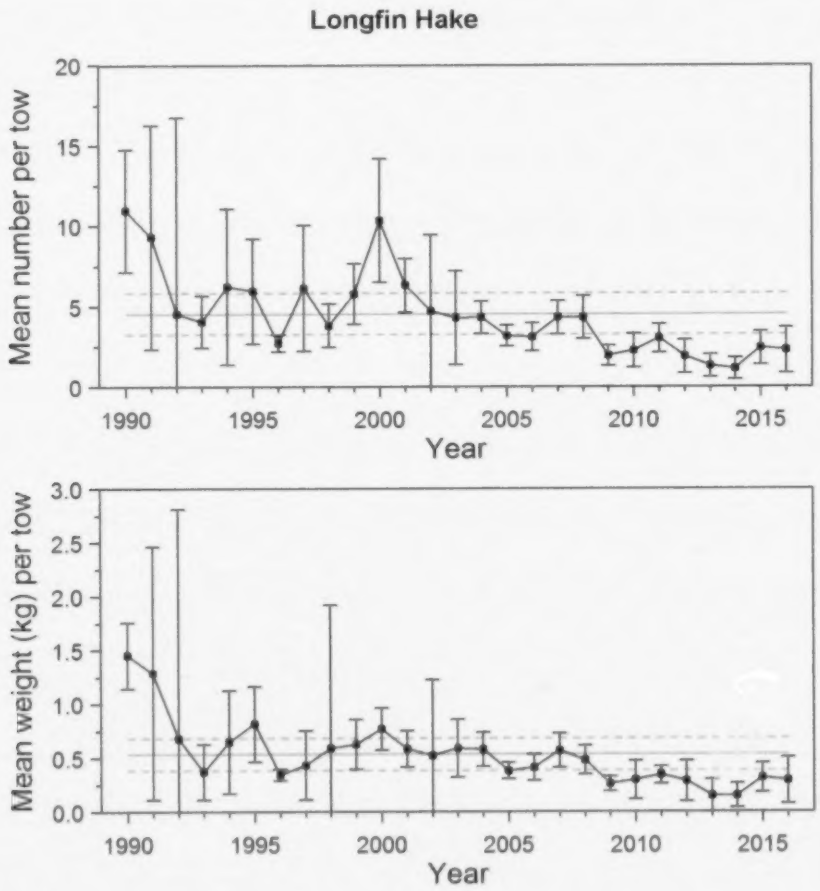

Figure 31. Mean numbers and mean weights per 15 minutes tow observed during the survey for Longfin Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

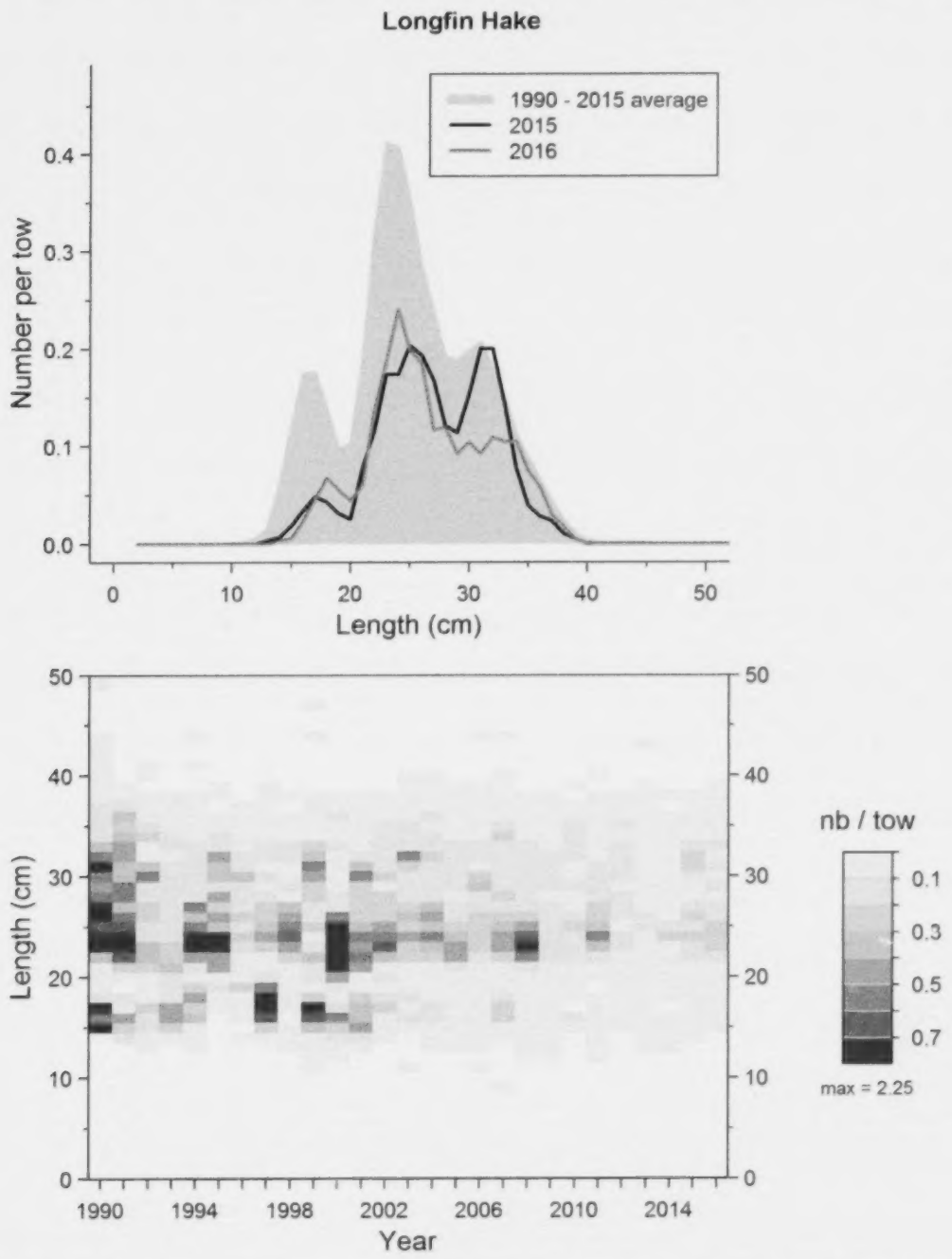

Figure 32. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Longfin Hake in 4RST.

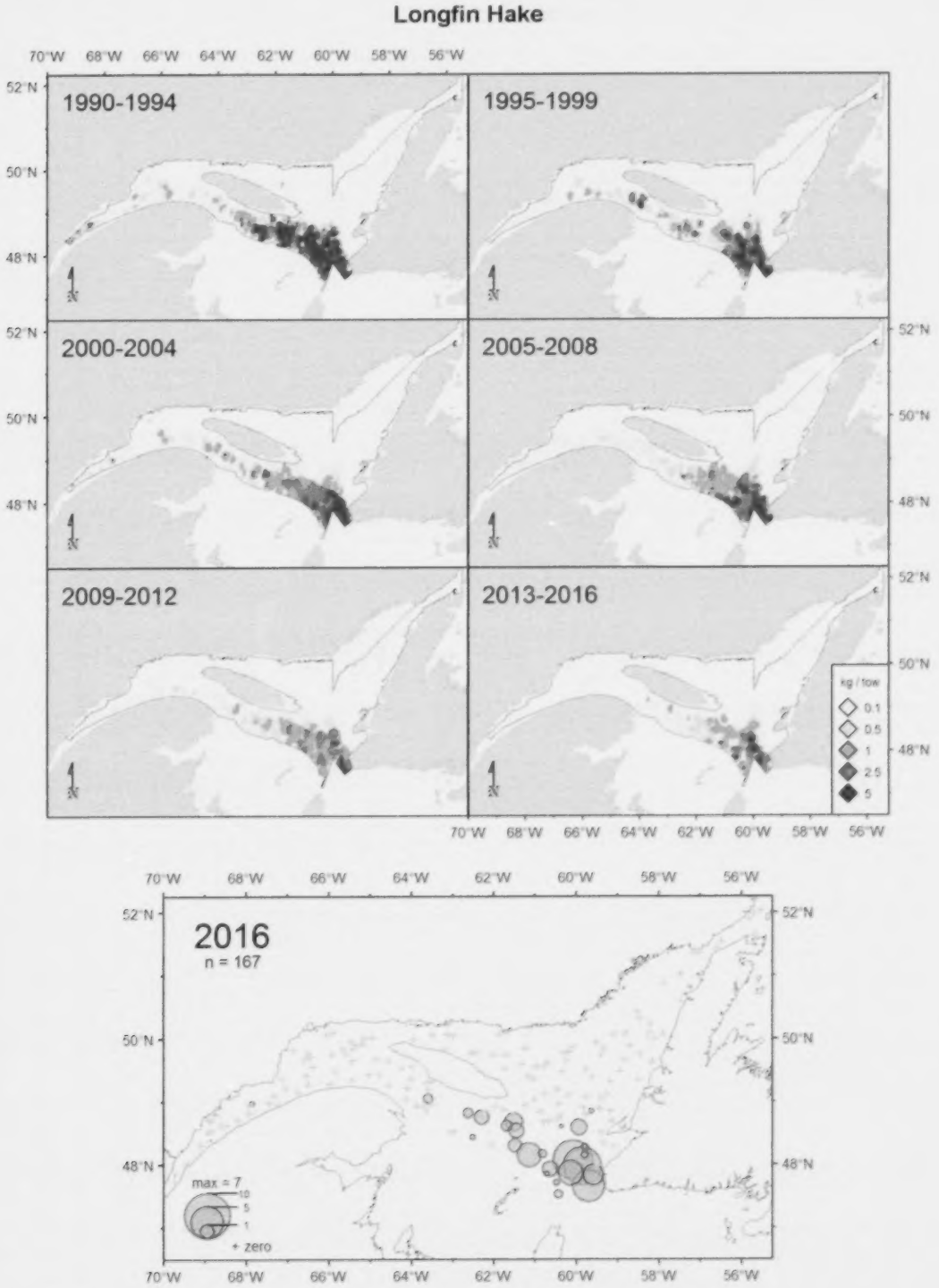

Figure 33. Longfin Hake catch rates (kg/15 minutes tow) distribution.

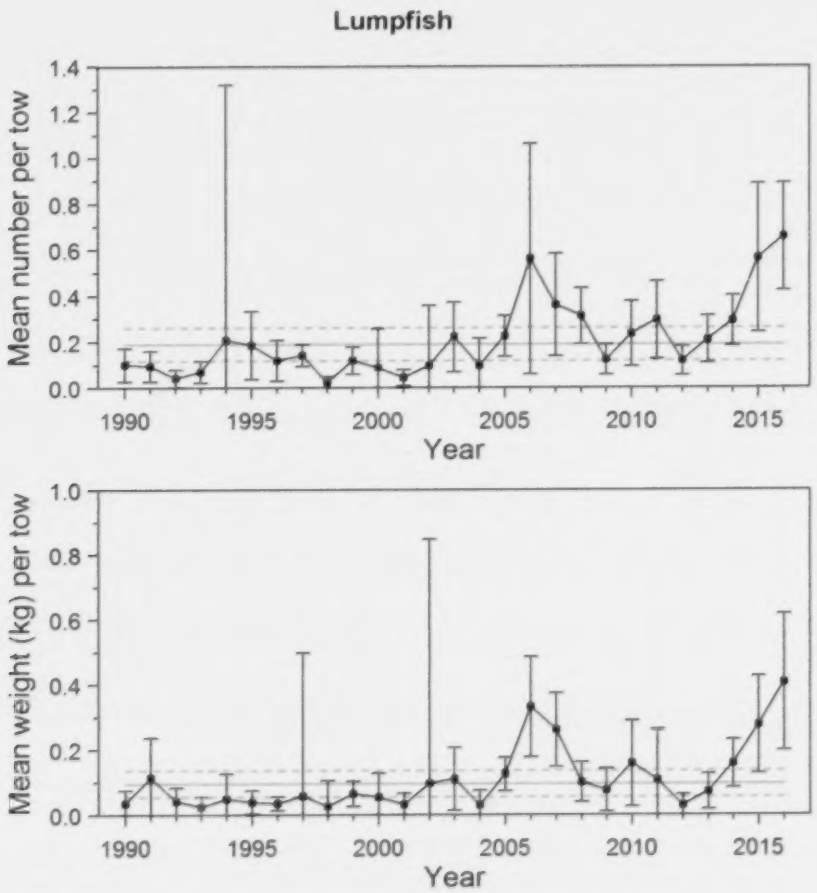

Figure 34. Mean numbers and mean weights per 15 minutes tow observed during the survey for Lumpfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

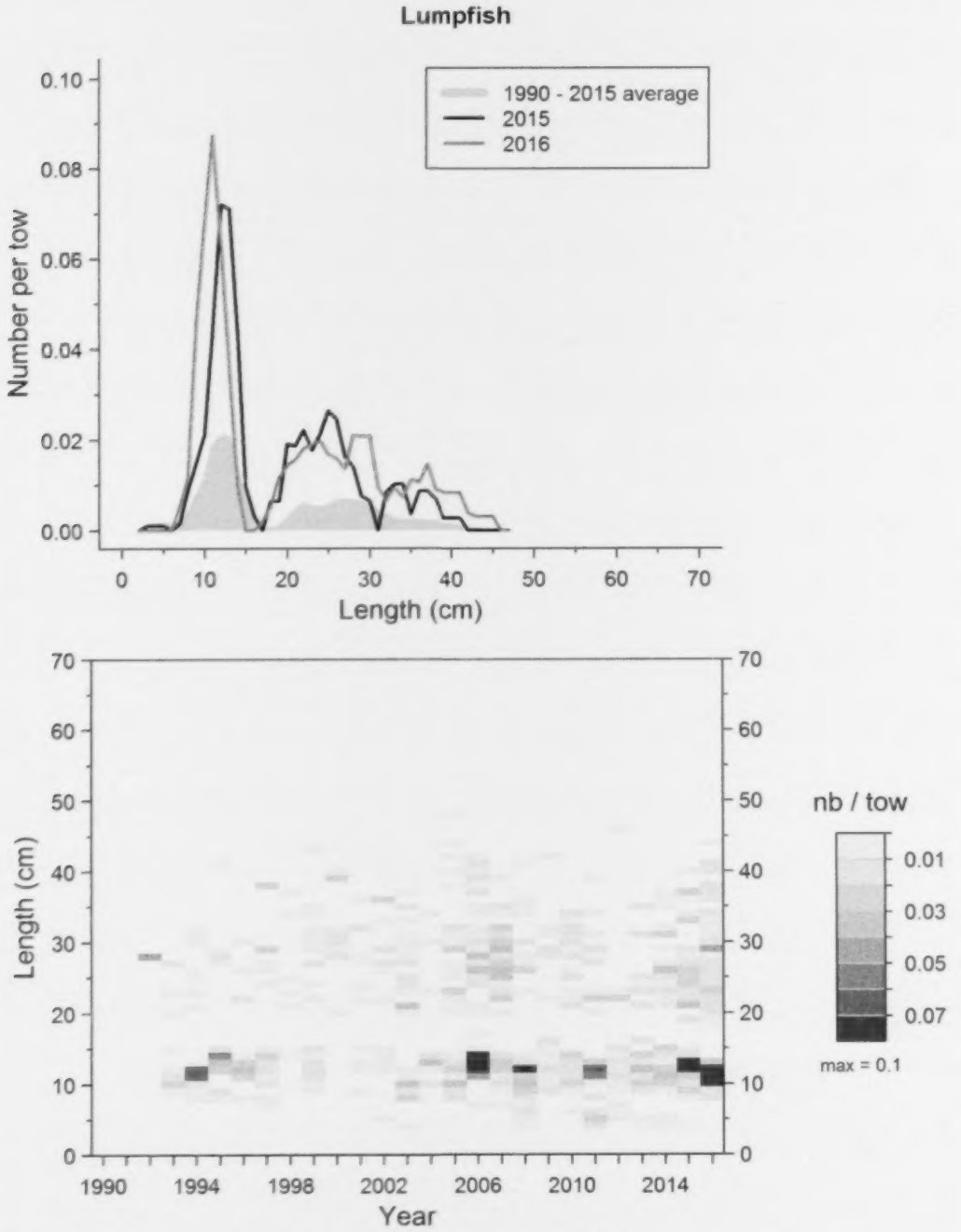

Figure 35. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Lumpfish in 4RST.

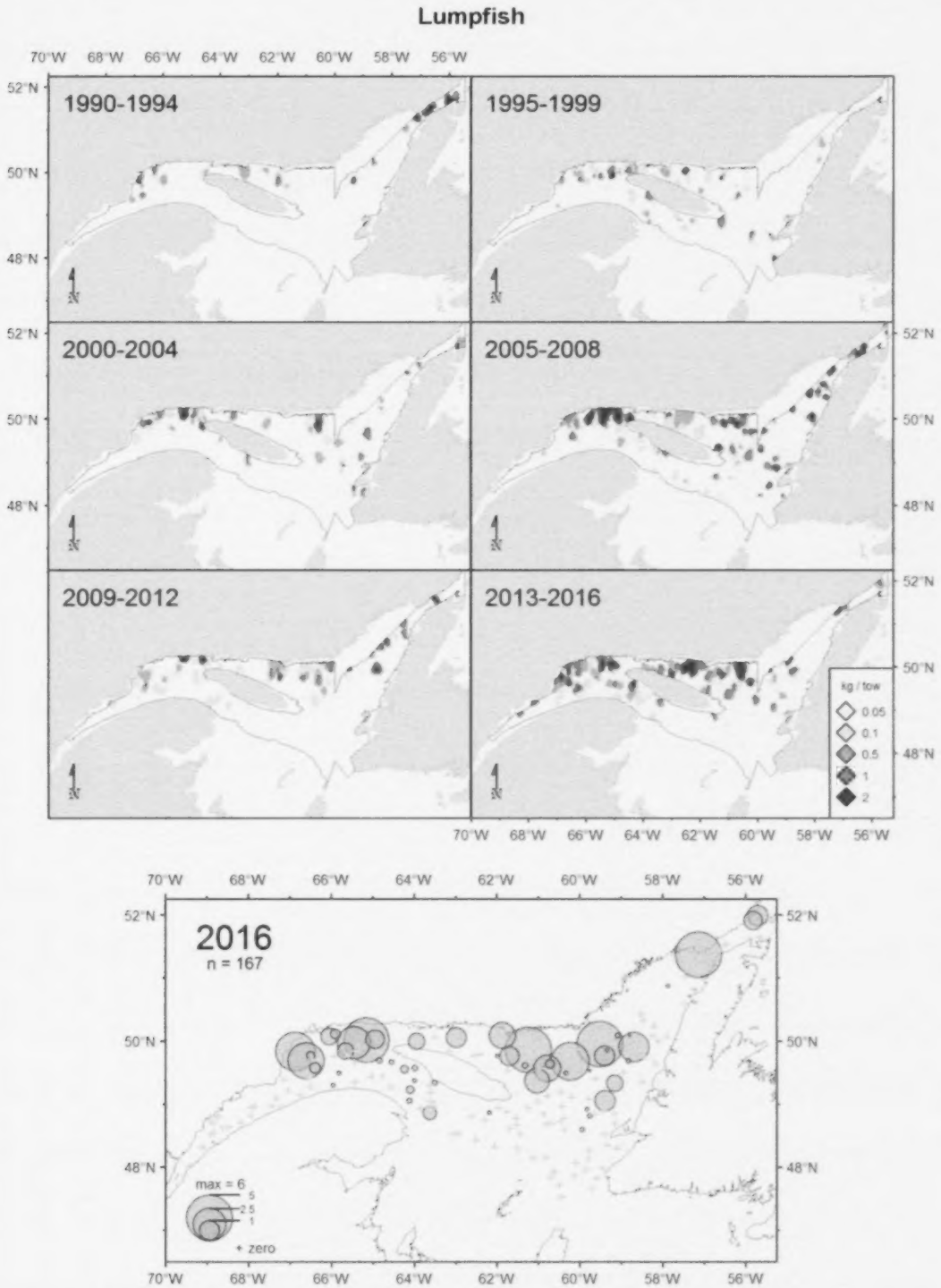

Figure 36. Lumpfish catch rates (kg/15 minutes tow) distribution.

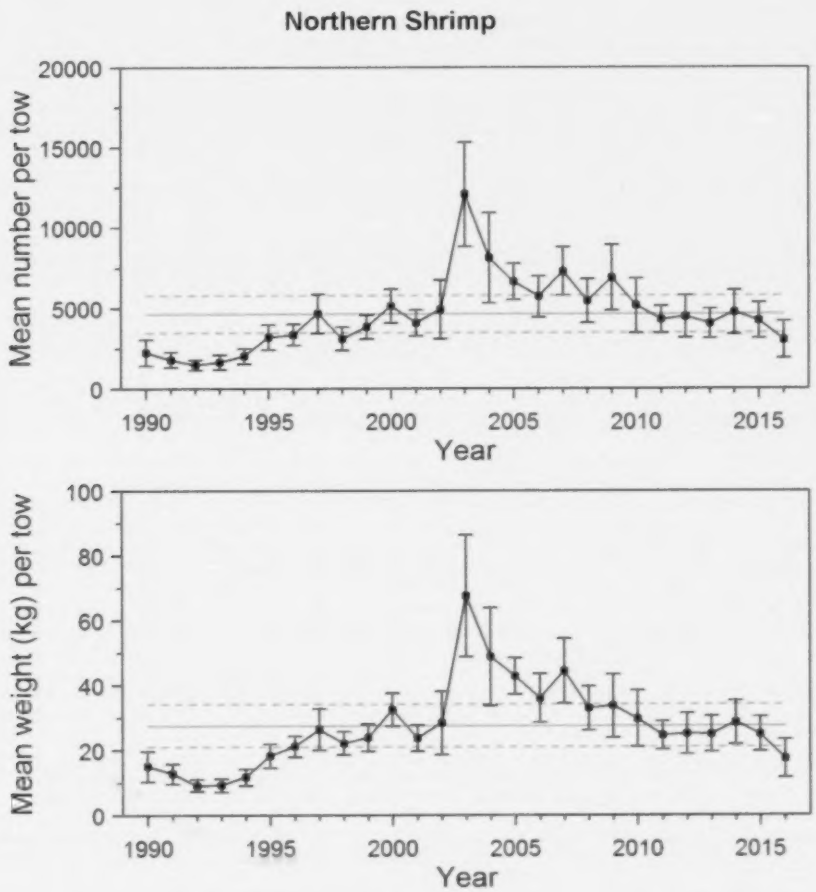

Figure 37. Mean numbers and mean weights per 15 minutes tow observed during the survey for Northern Shrimp in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

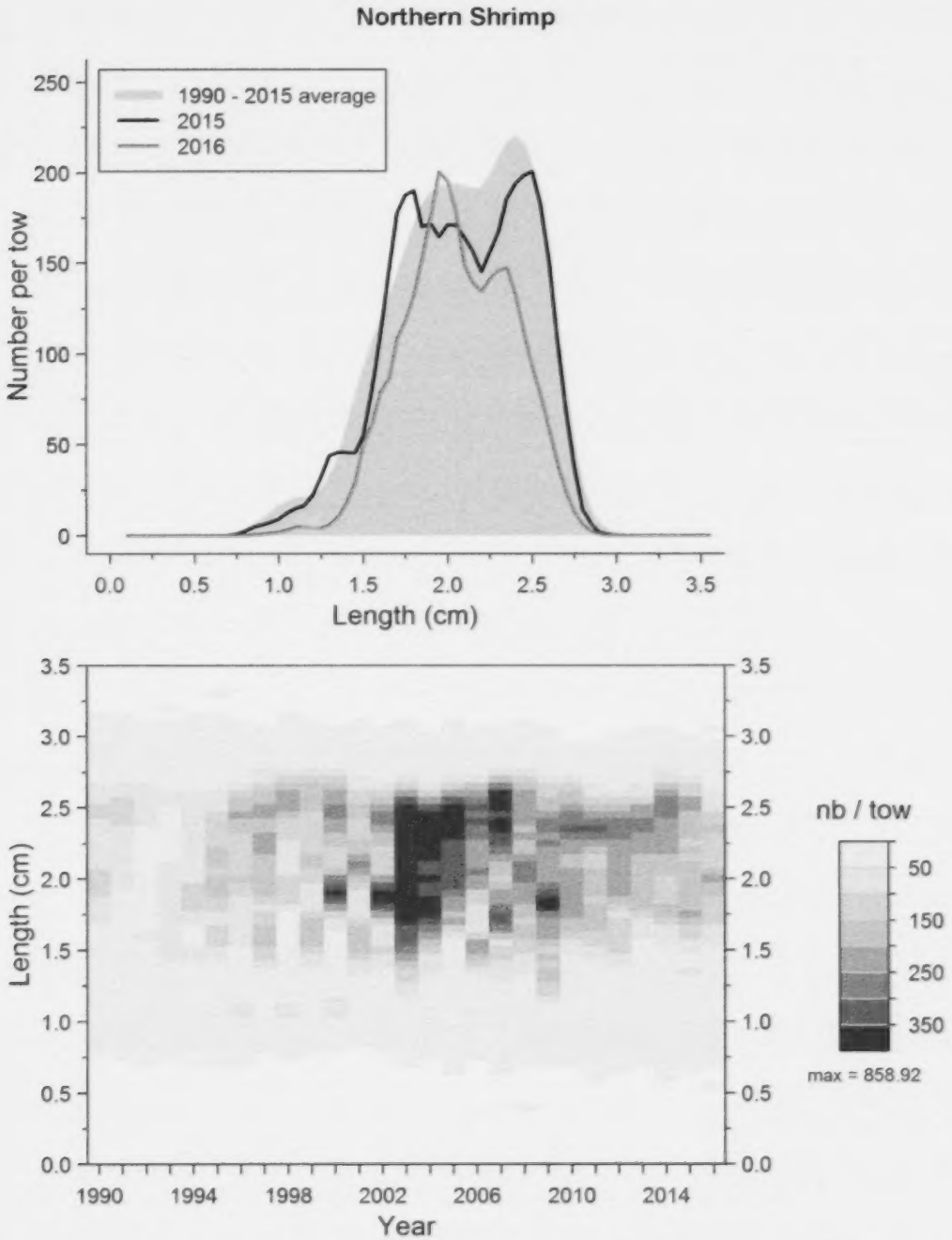

Figure 38. Carapace length frequency distributions (mean number per 15 minutes tow) observed during the survey for Northern Shrimp in 4RST.

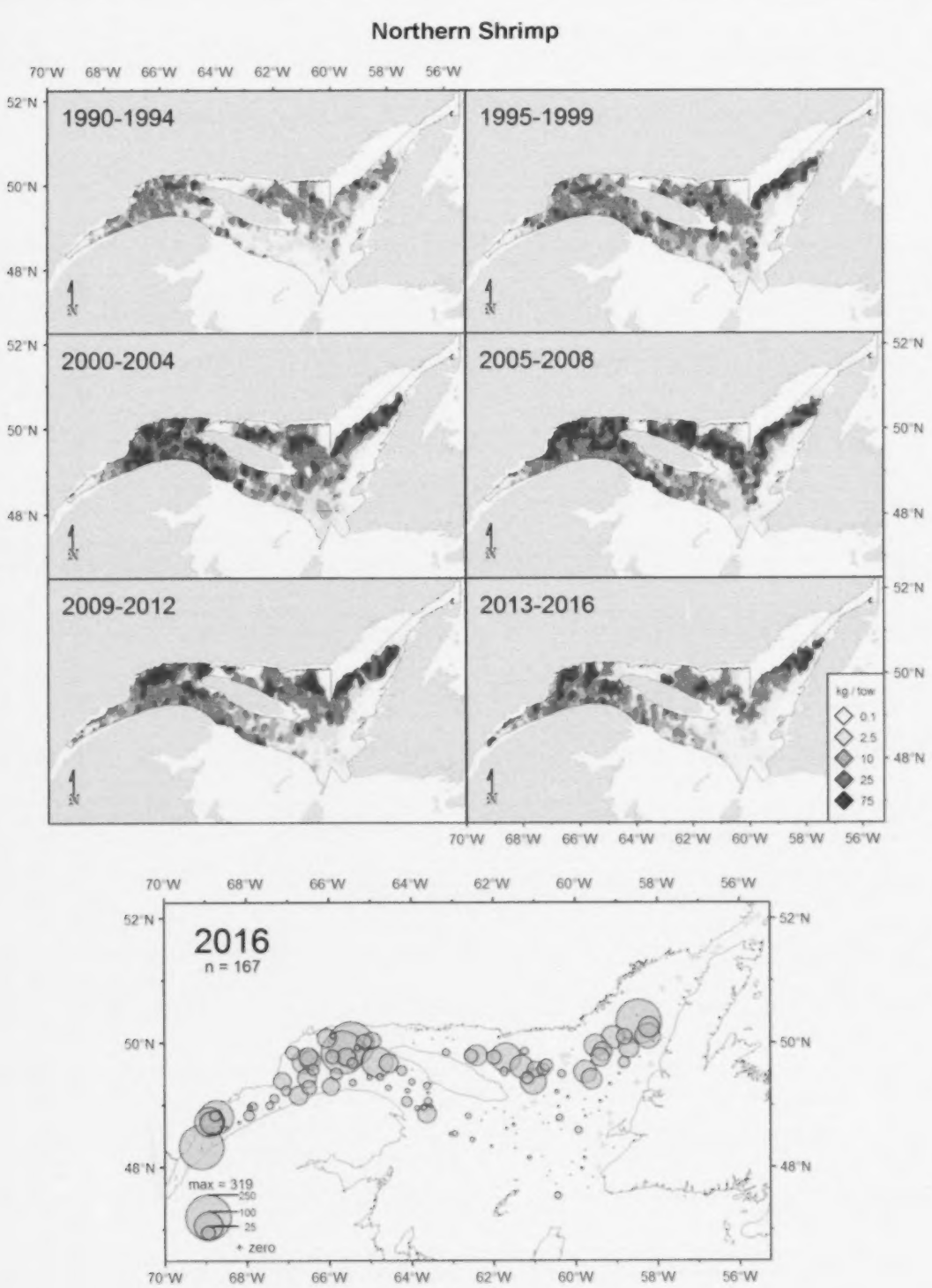

Figure 39. Northern Shrimp catch rates (kg/15 minutes tow) distribution.

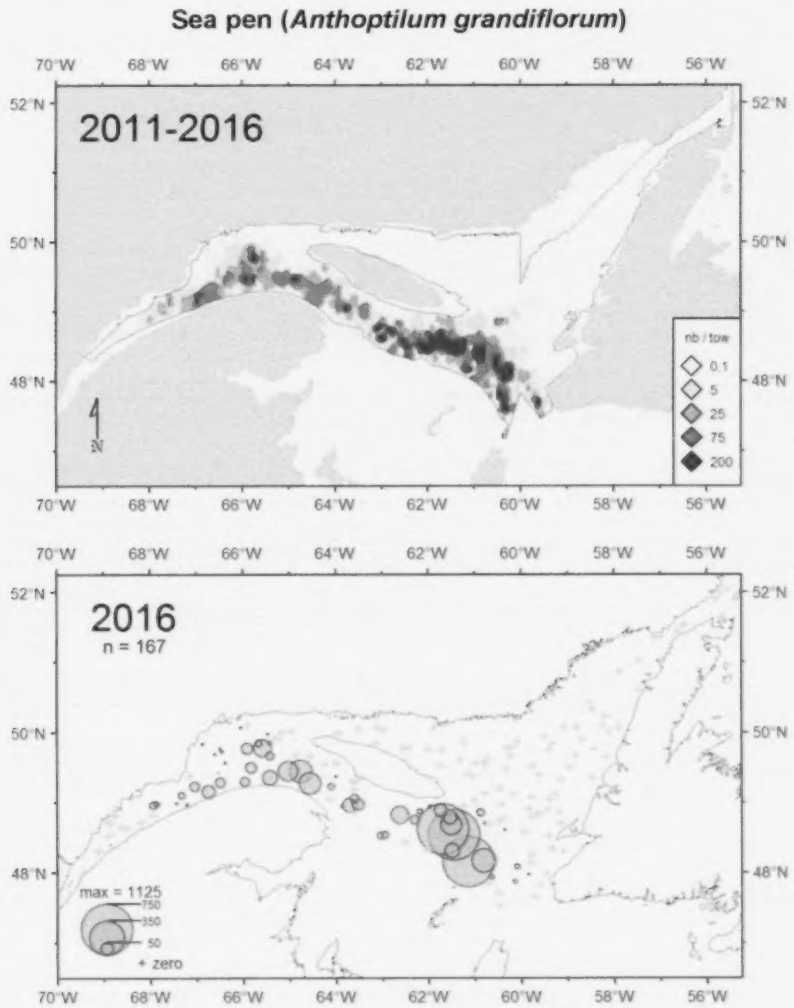

Figure 40. Sea pen Anthoptilum grandiflorum catch rates (nb/15 minutes tow) distribution.

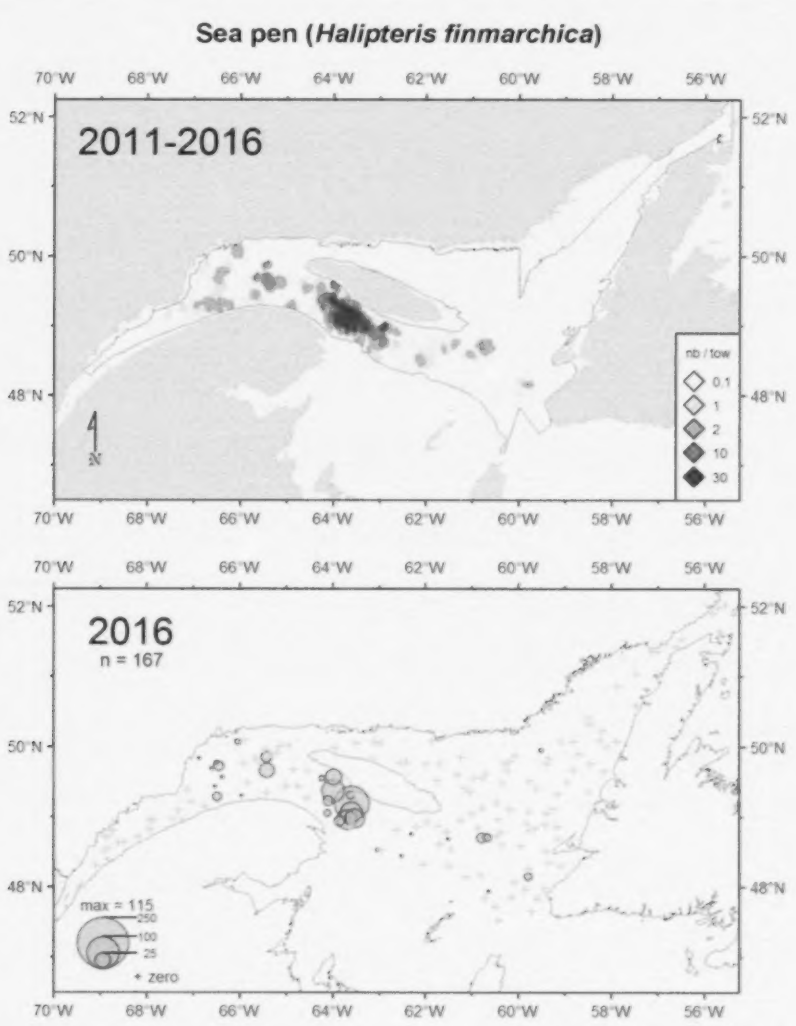

Figure 41. Sea pen Halipteris finmarchica catch rates (nb/15 minutes tow) distribution.

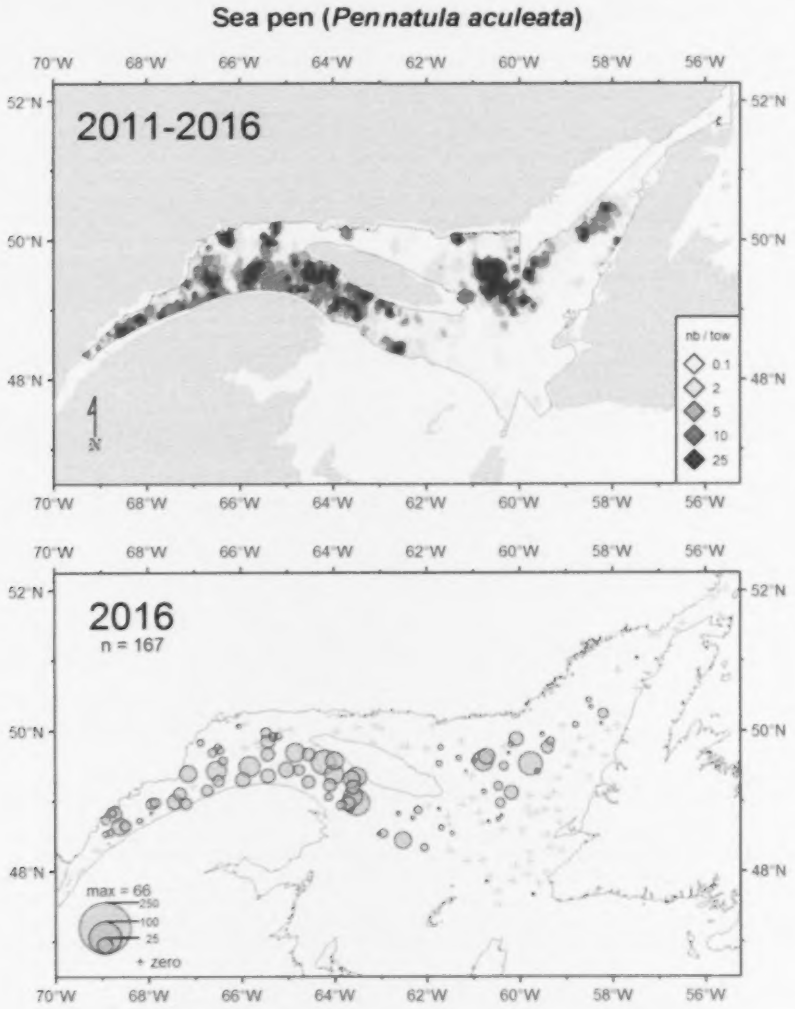

Figure 42. Sea pen Pennatula aculeata catch rates (nb/15 minutes tow) distribution.

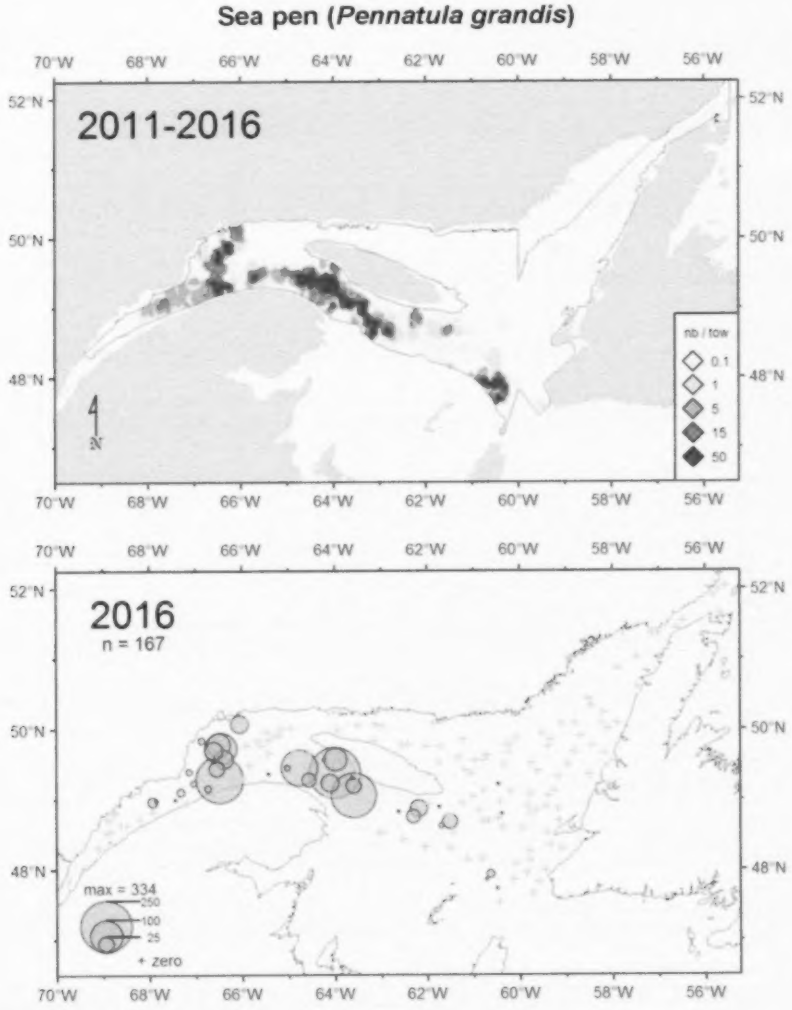

Figure 43. Sea pen Pennatula grandis catch rates (nb/15 minutes tow) distribution.

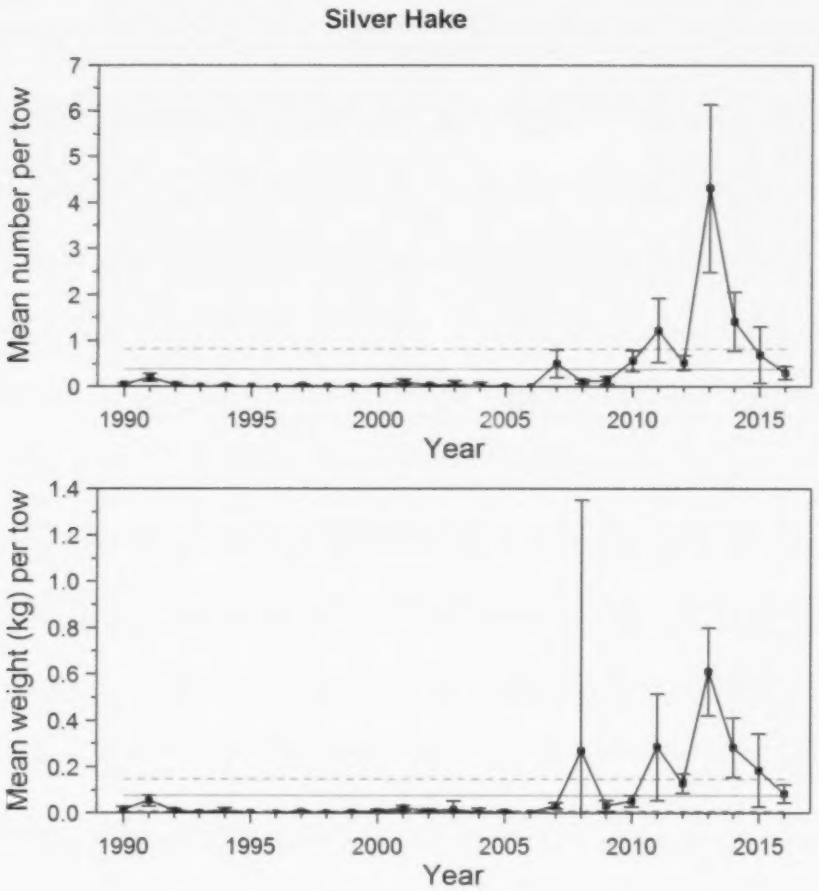

Figure 44. Mean numbers and mean weights per 15 minutes tow observed during the survey for Silver Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

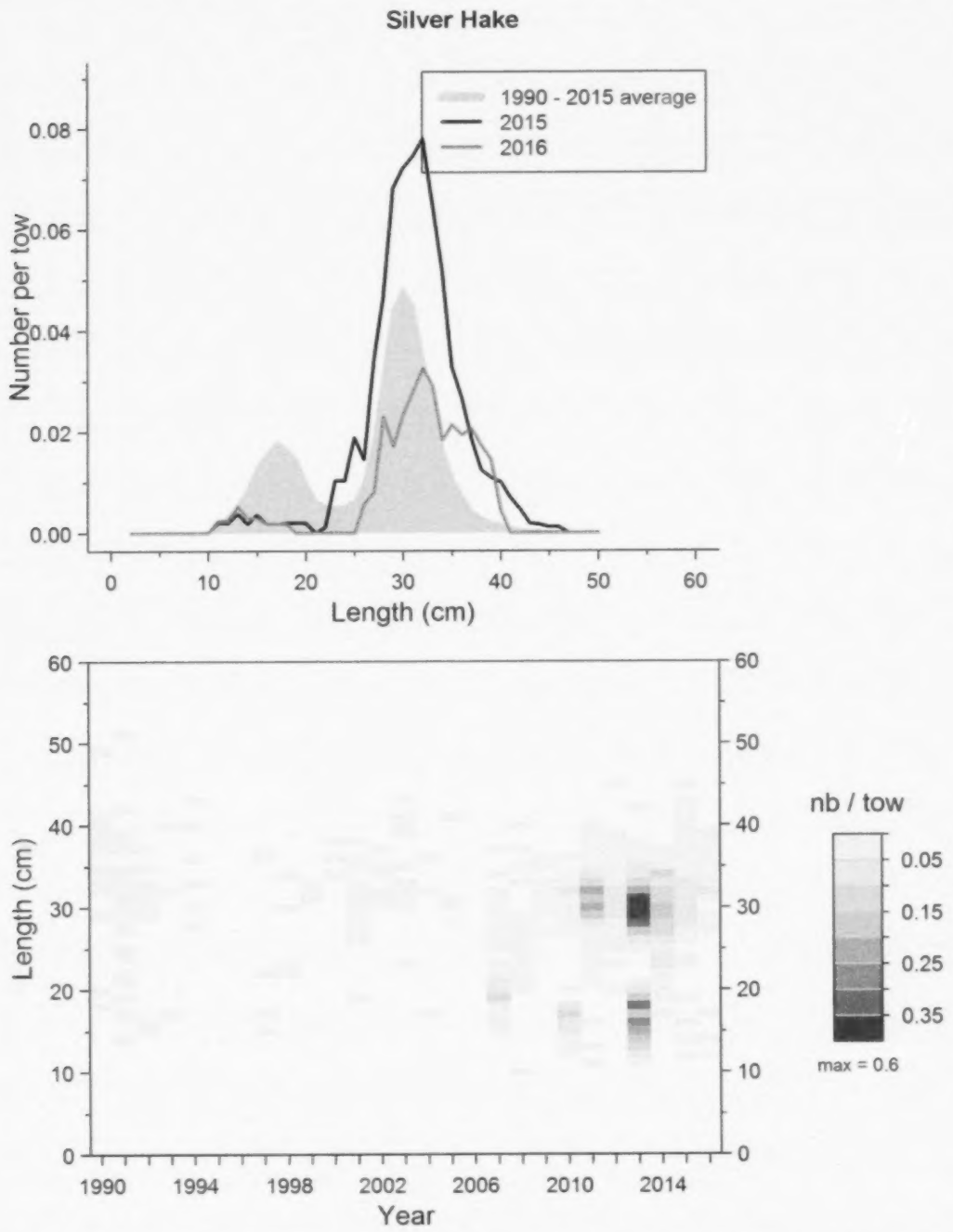

Figure 45. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Silver Hake in 4RST.

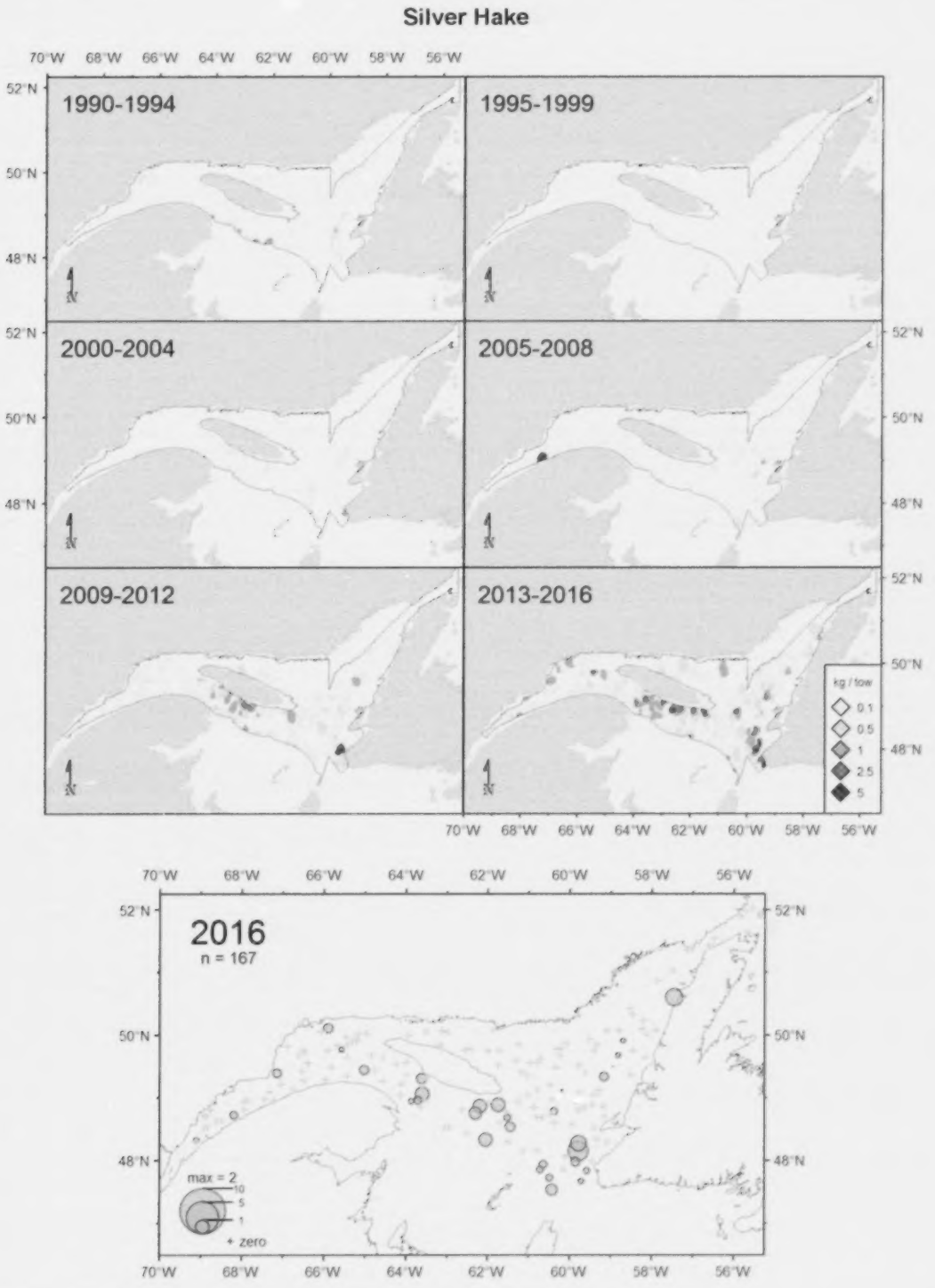

Figure 46. Silver Hake catch rates (kg/15 minutes tow) distribution.

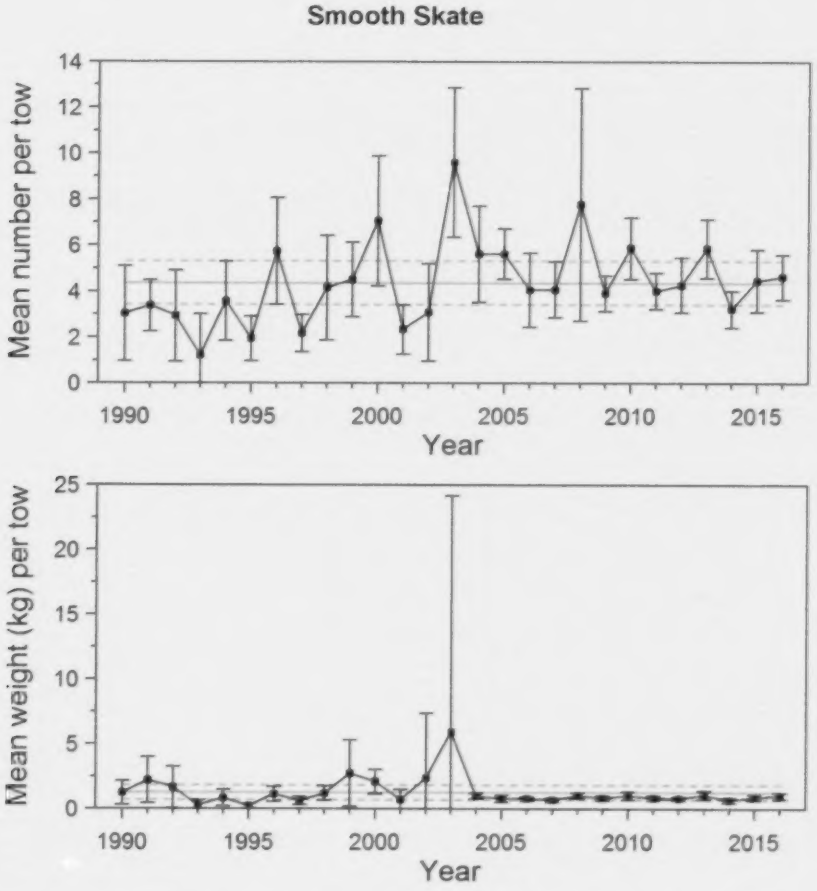

Figure 47. Mean numbers and mean weights per 15 minutes tow observed during the survey for Smooth Skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

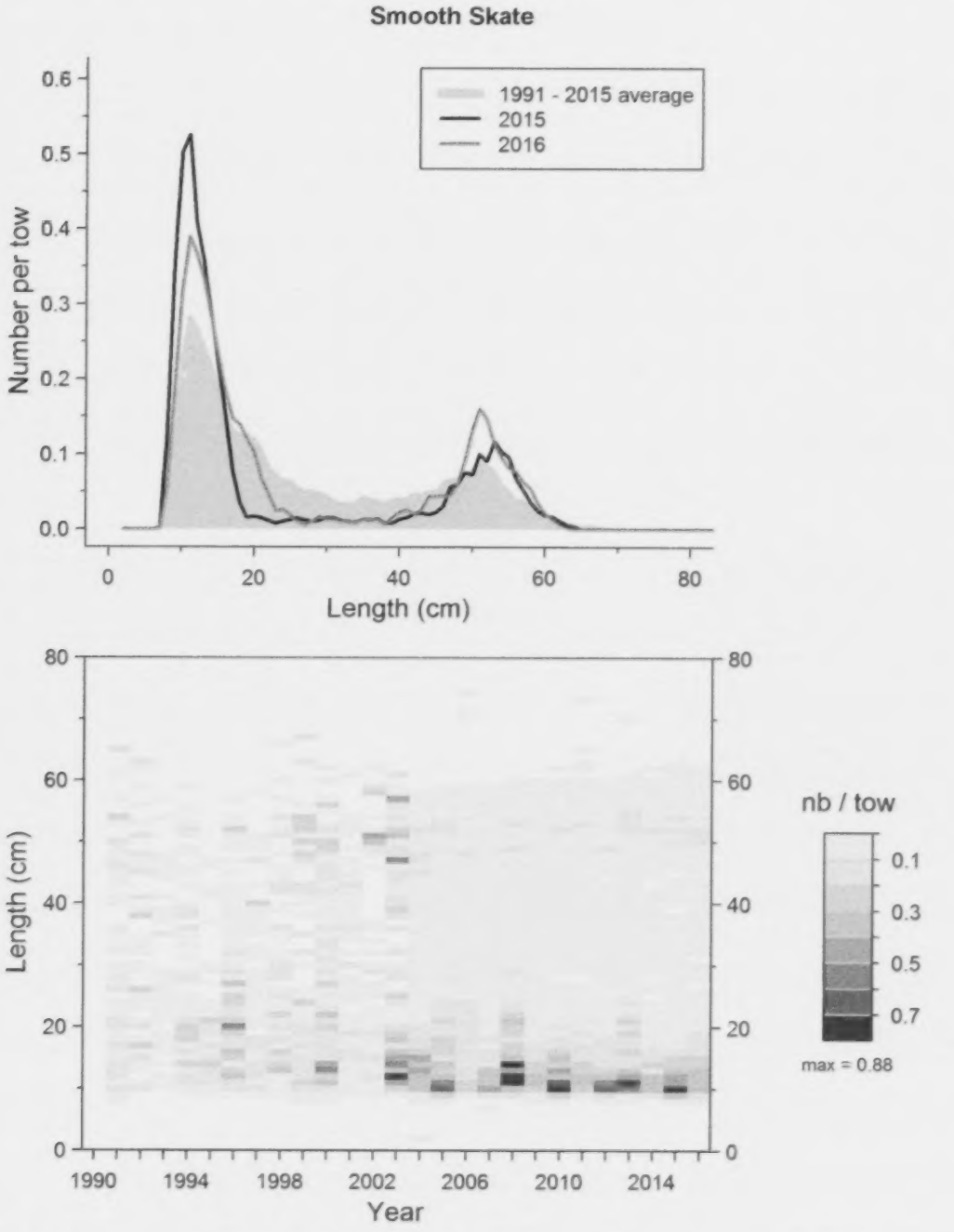

Figure 48. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Smooth Skate in 4RST.

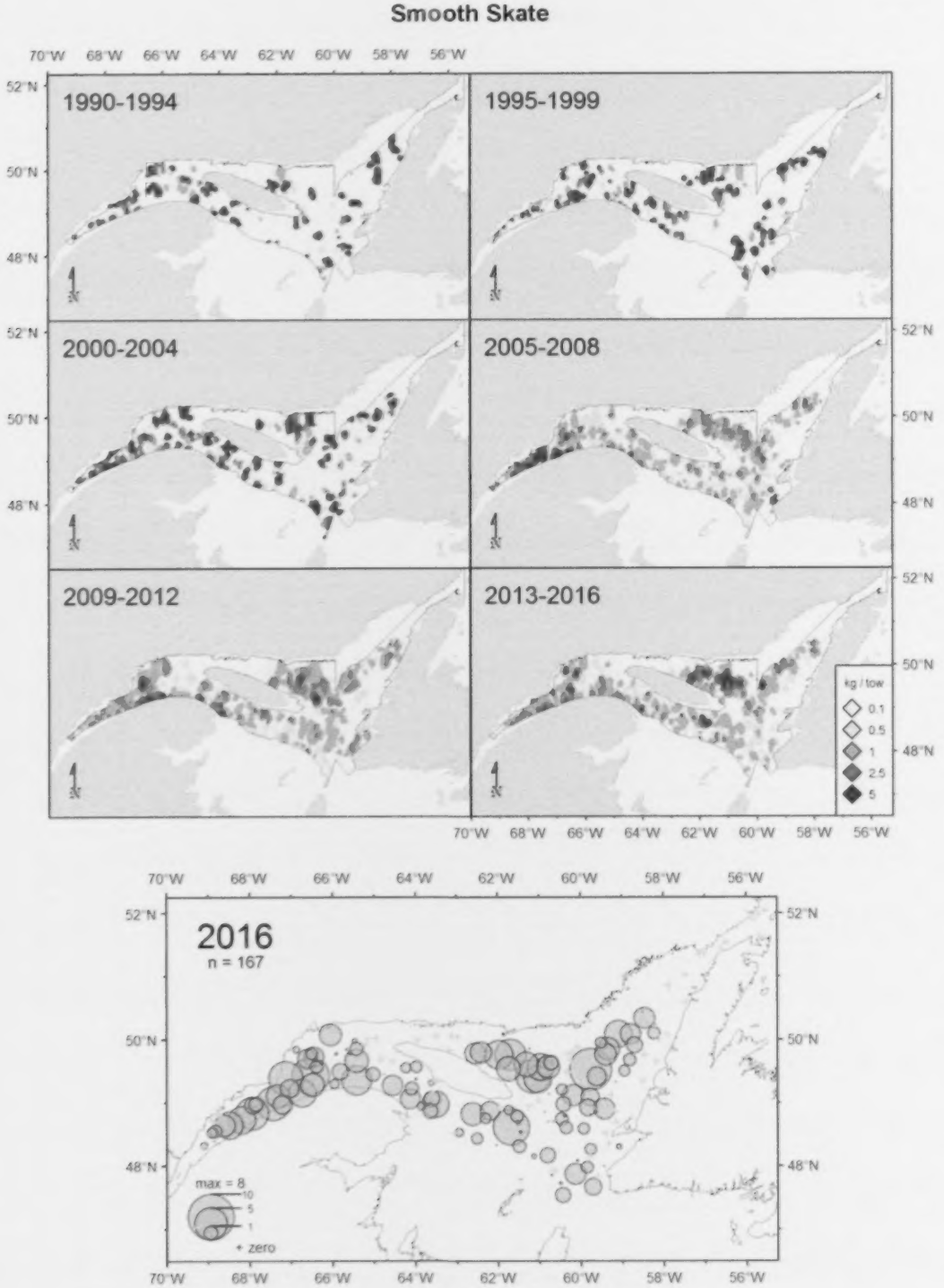

Figure 49. Smooth Skate catch rates (kg/15 minutes tow) distribution.

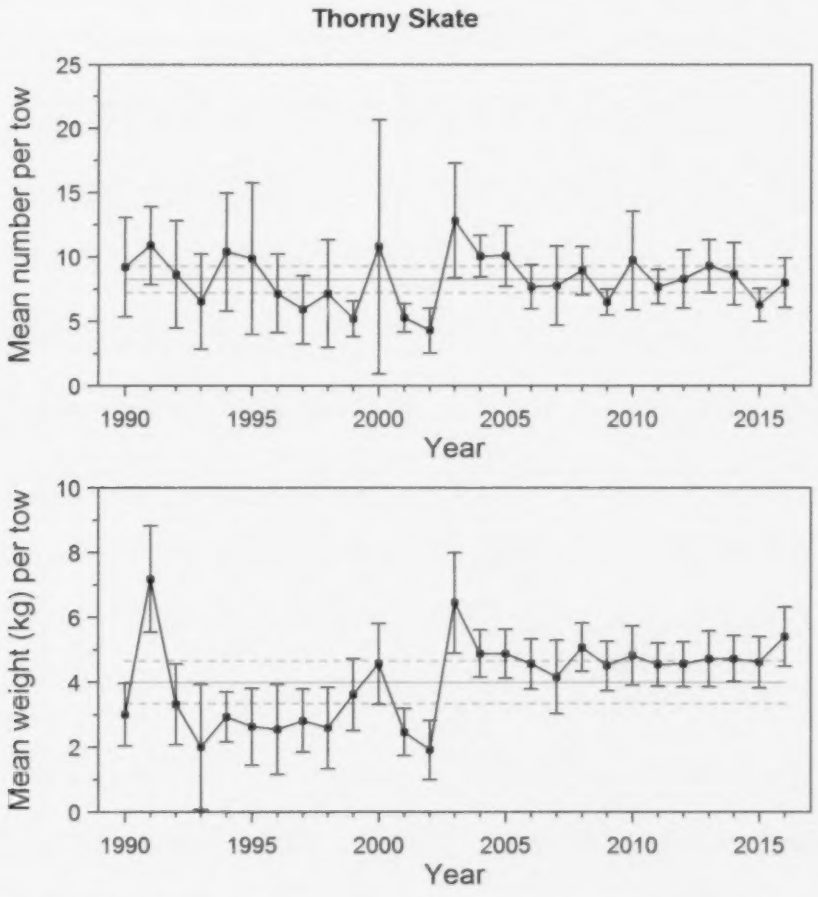

Figure 50. Mean numbers and mean weights per 15 minutes tow observed during the survey for Thorny Skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

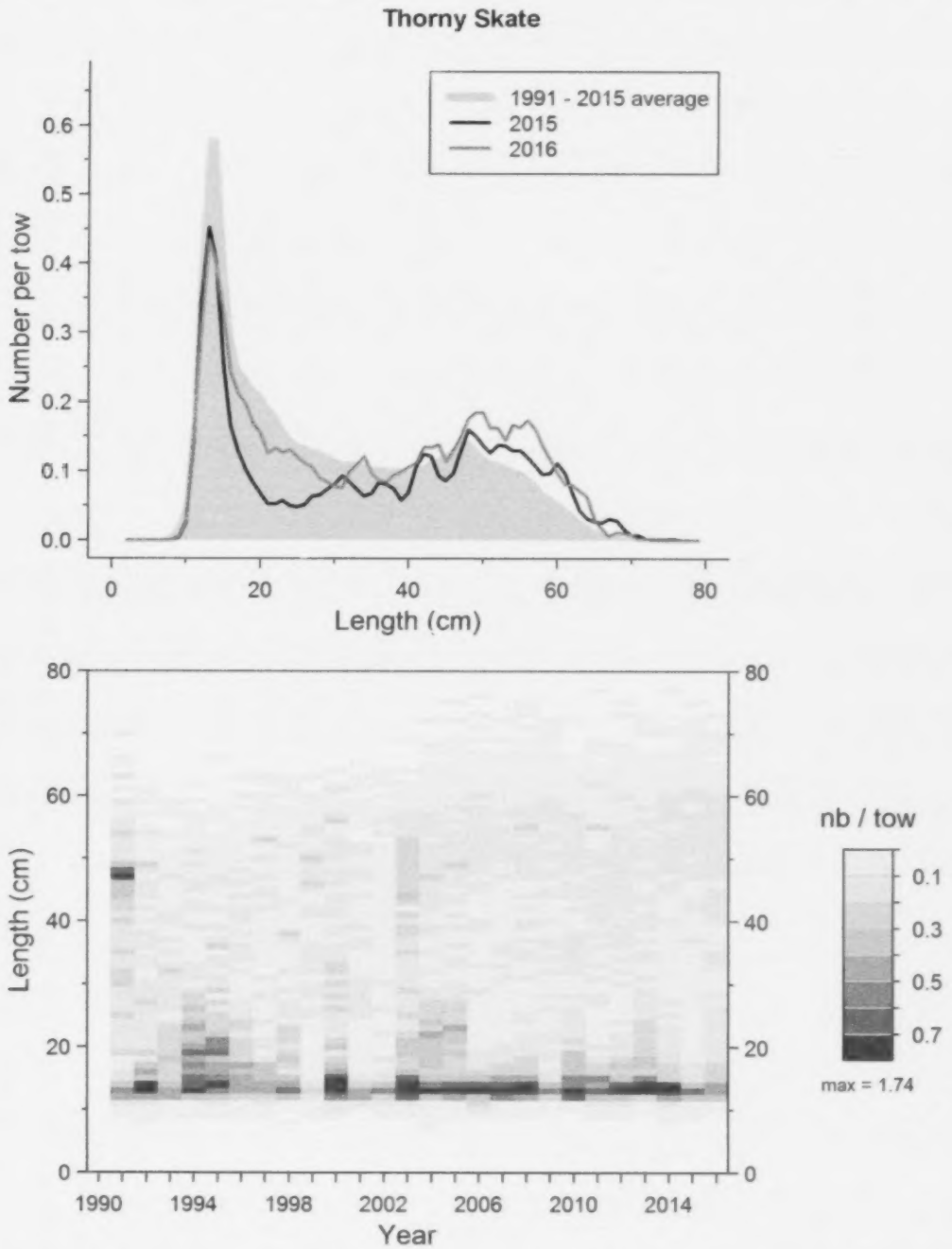

Figure 51. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Thorny Skate in 4RST.

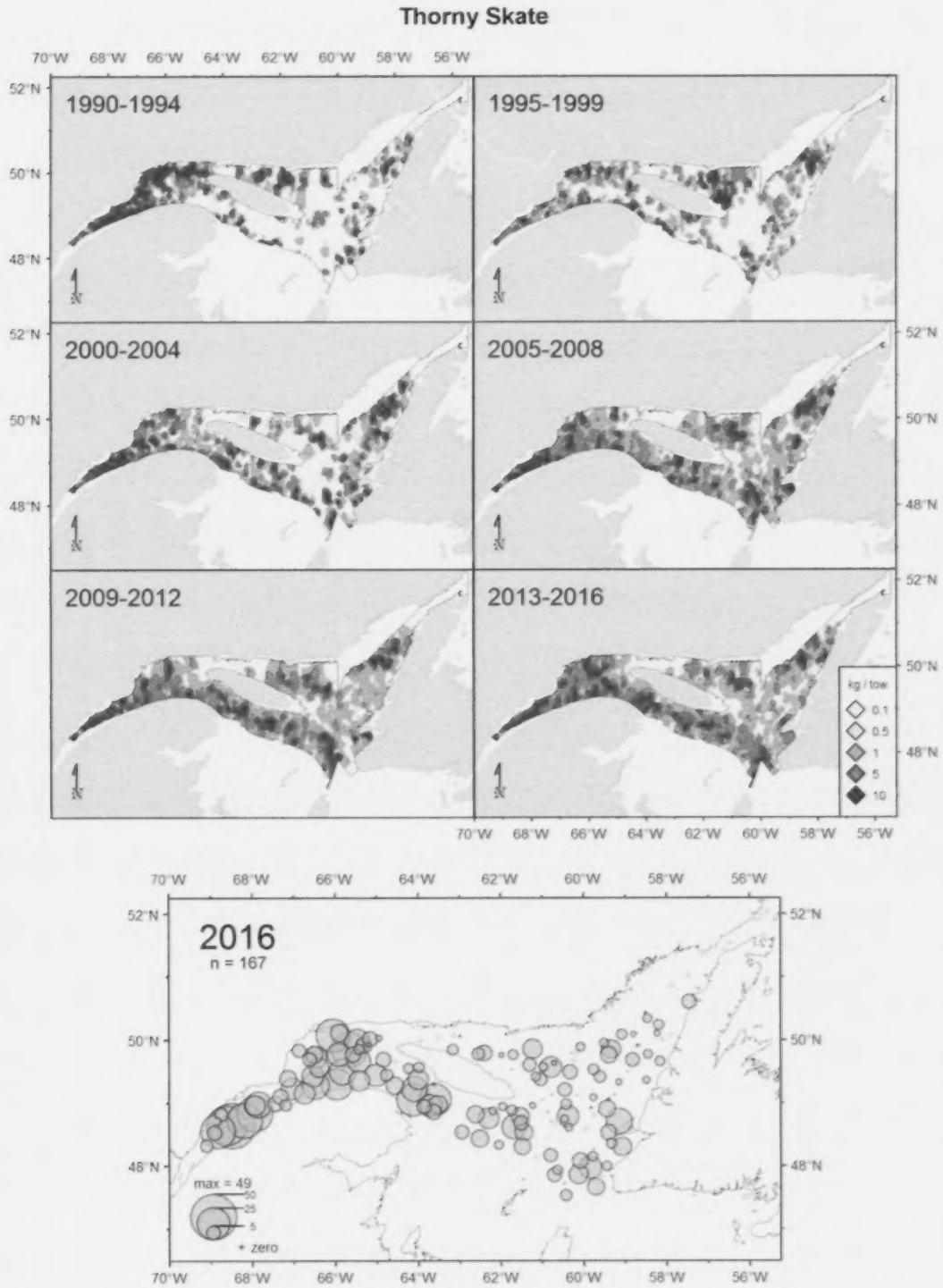

Figure 52. Thorny Skate catch rates (kg/15 minutes tow) distribution.

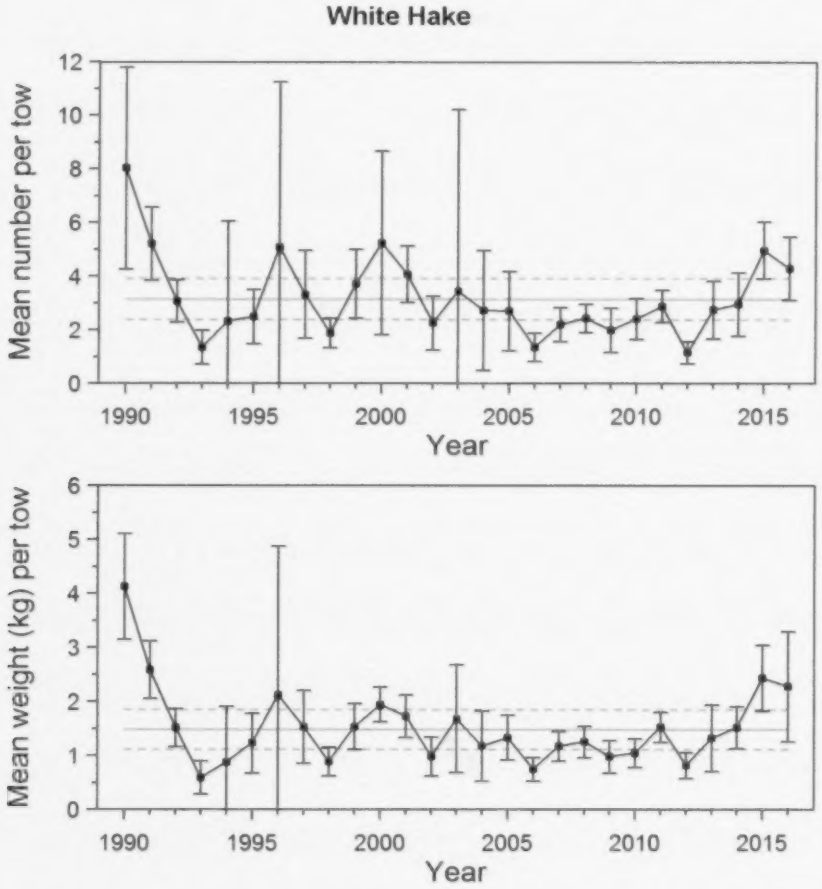

Figure 53. Mean numbers and mean weights per 15 minutes tow observed during the survey for White Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

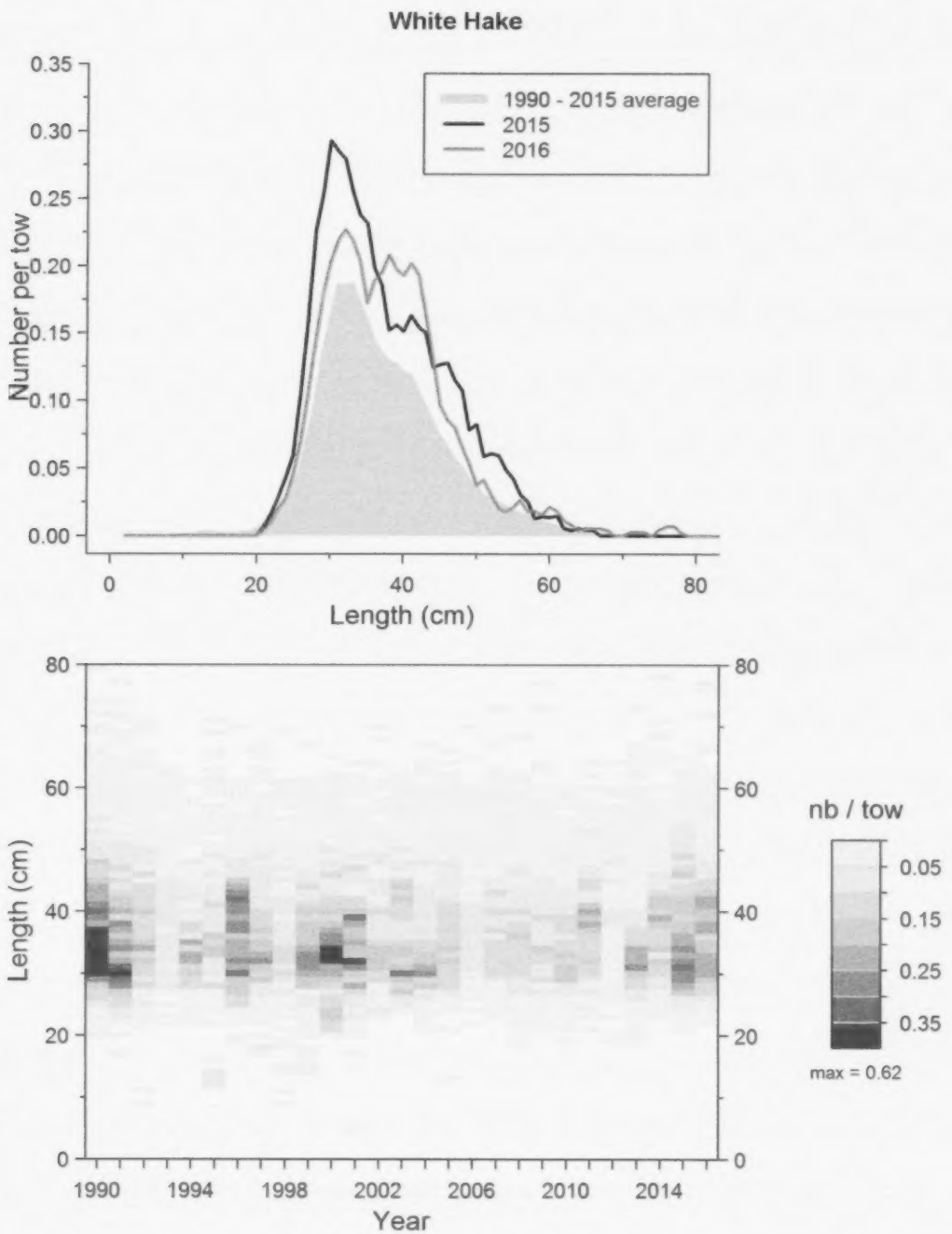

Figure 54. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for White Hake in 4RST.

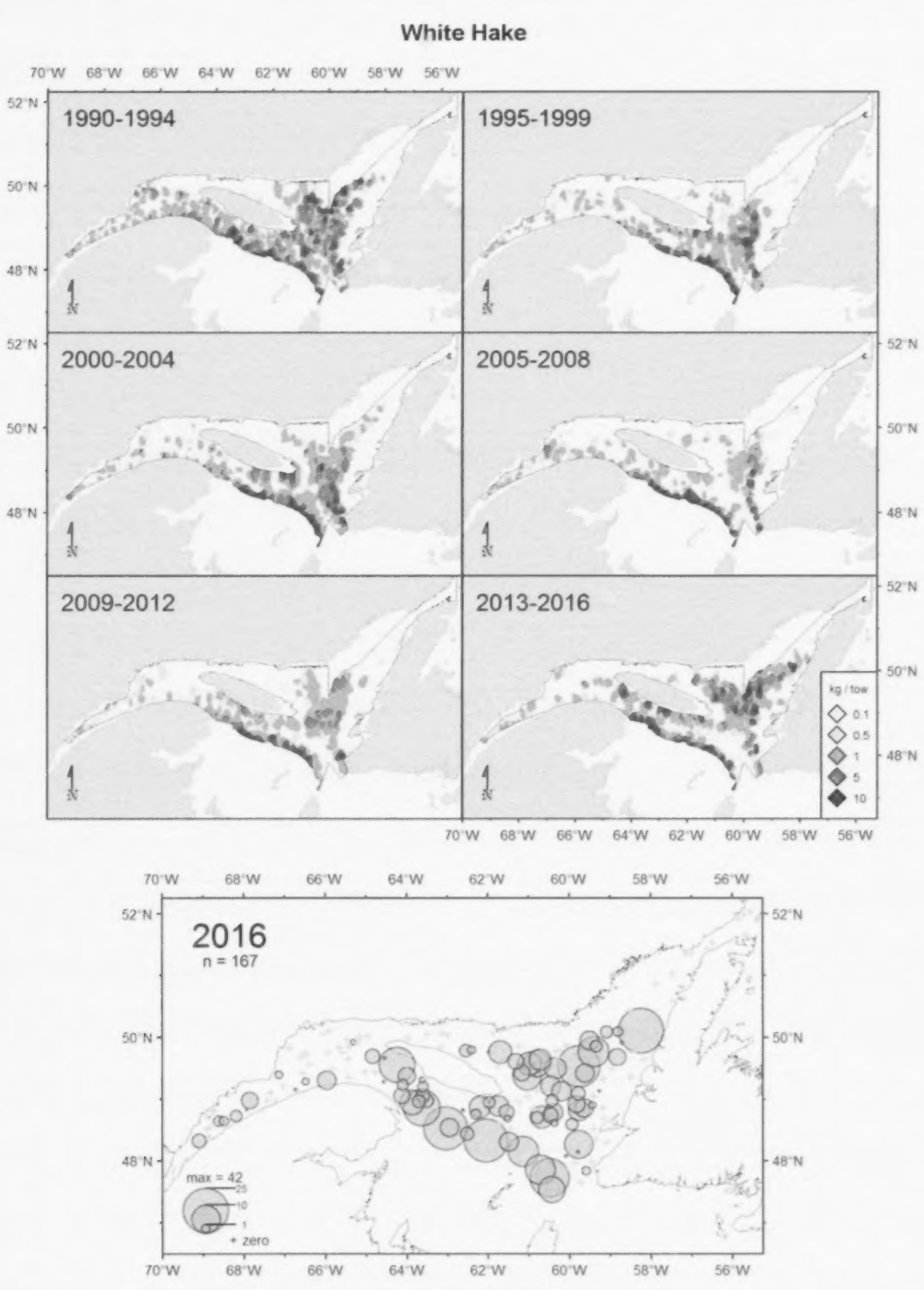

Figure 55. White Hake catch rates (kg/15 minutes tow) distribution.

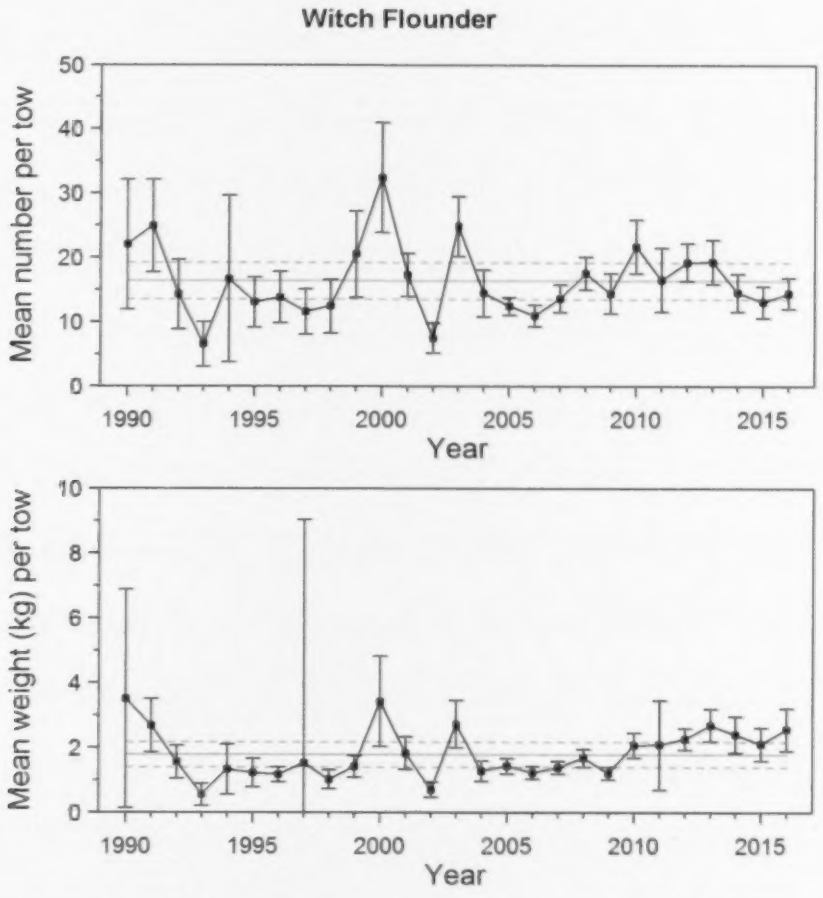

Figure 56. Mean numbers and mean weights per 15 minutes tow observed during the survey for Witch Flounder in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2015 period (solid line) and upper and lower reference (see text) limits (dashed lines).

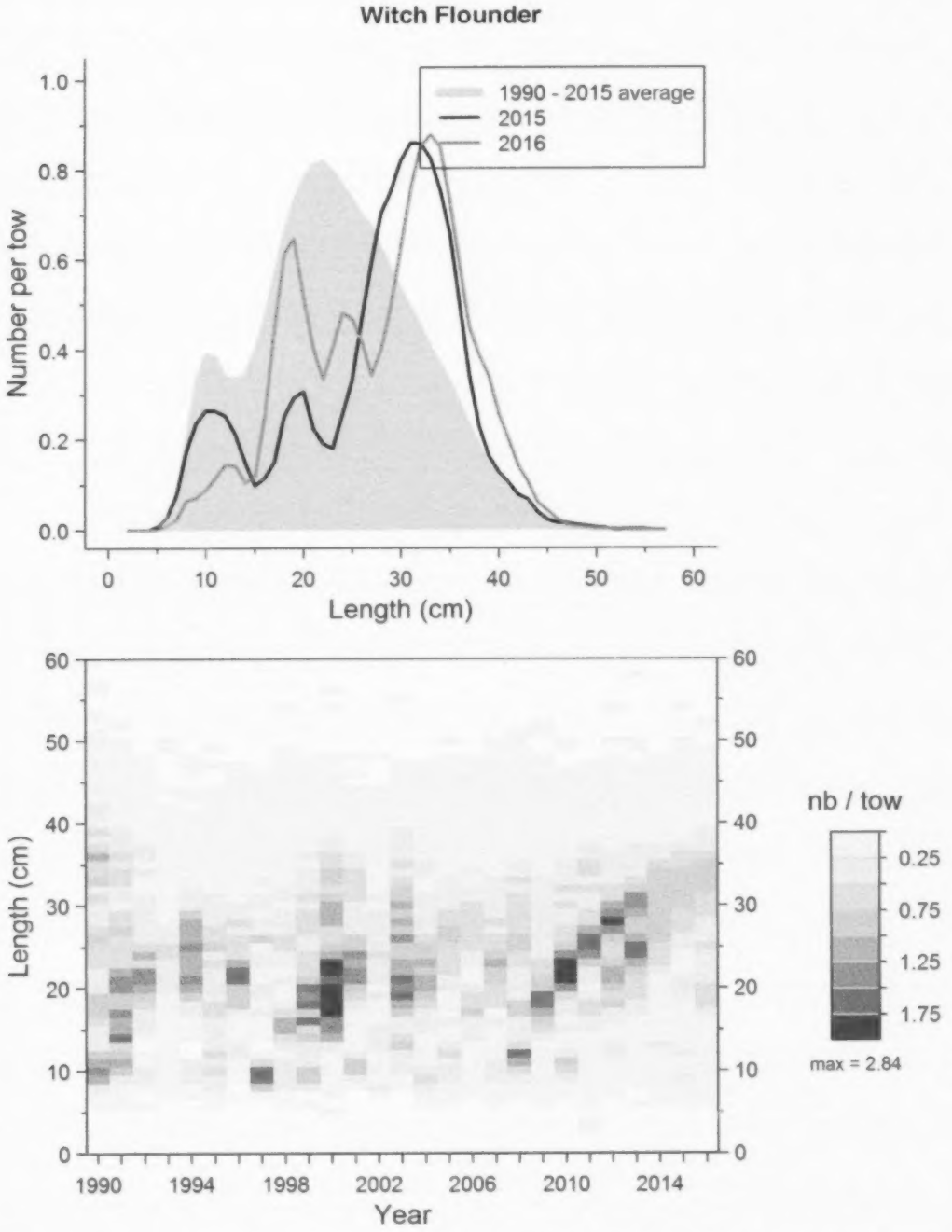

Figure 57. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Witch Flounder in 4RST.

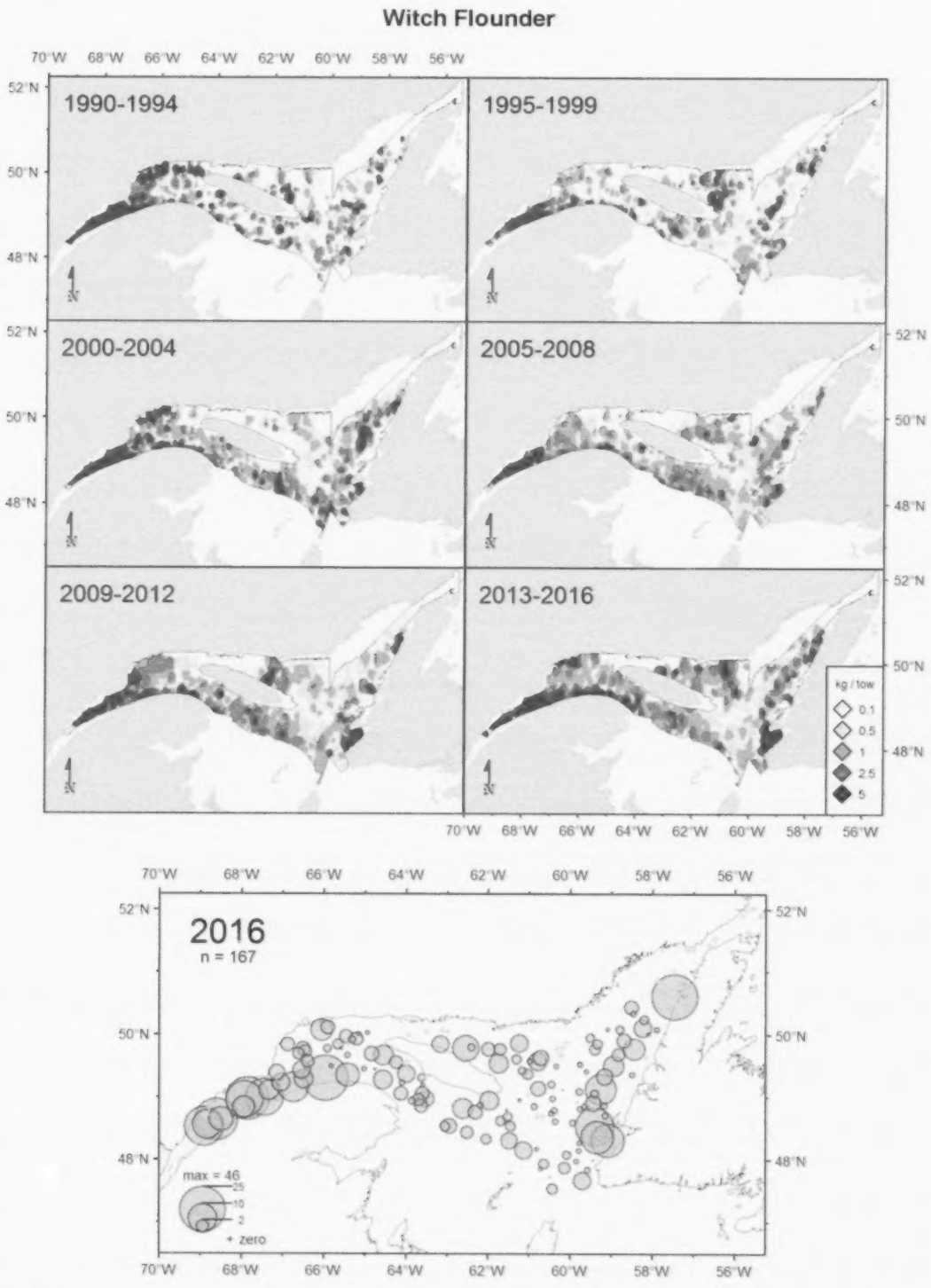

Figure 58. Witch Flounder catch rates (kg/15 minutes tow) distribution.

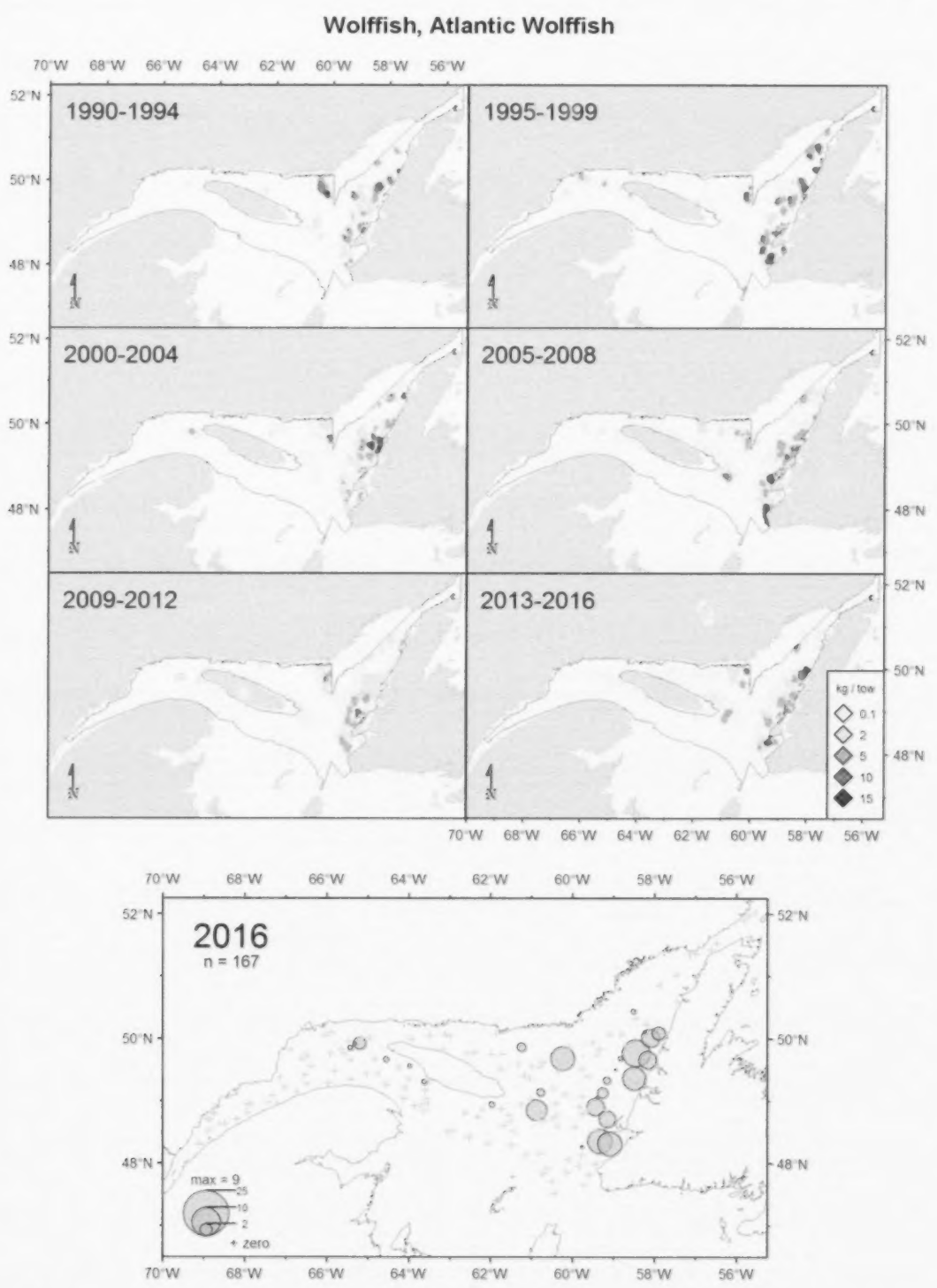

Figure 59. Atlantic Wolffish catch rates (kg/15 minutes tow) distribution.

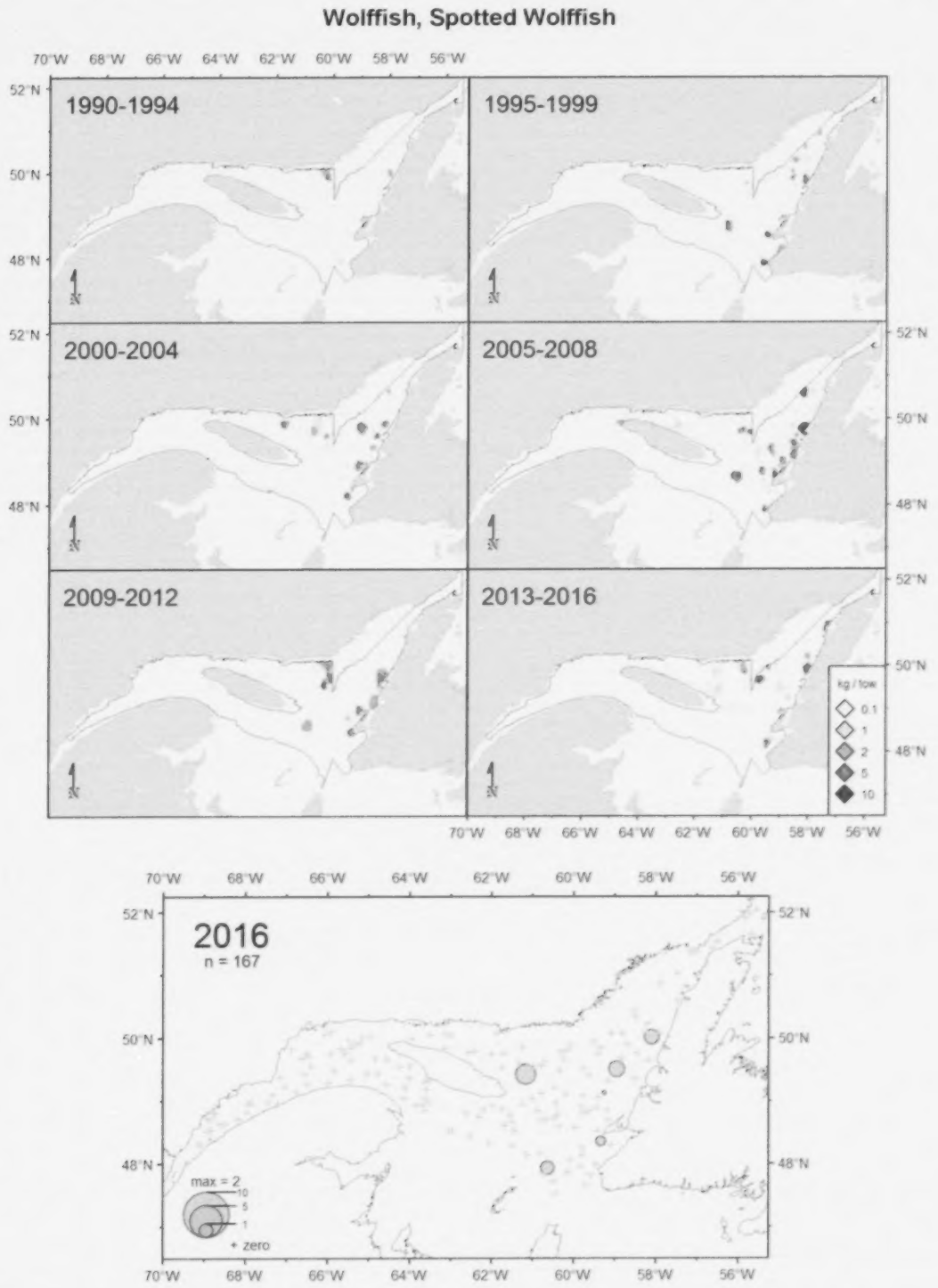

Figure 60. Spotted Wolffish catch rates (kg/15 minutes tow) distribution.

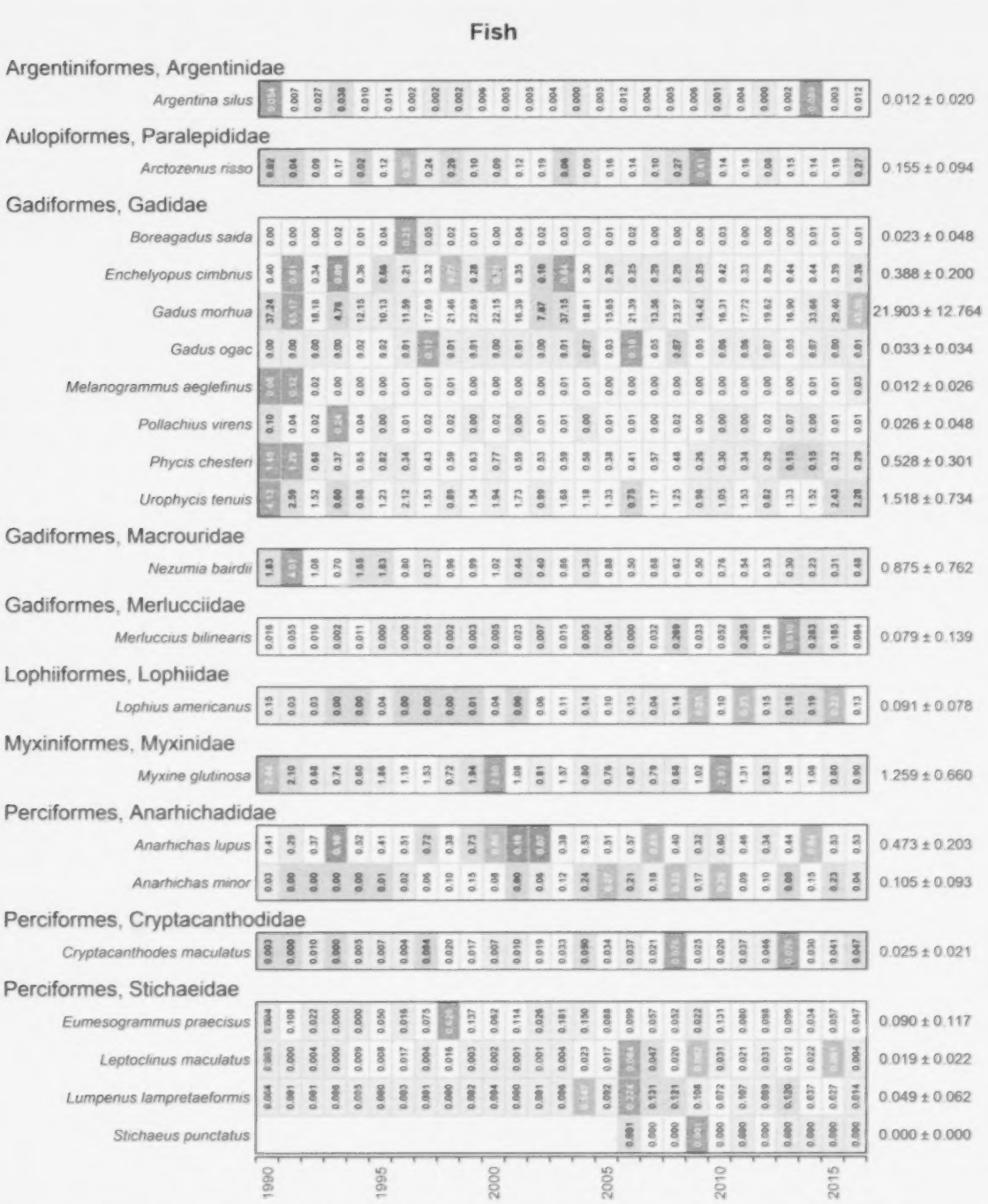

Figure 61. Average weight per 15-minute tow during the fish taxa survey. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

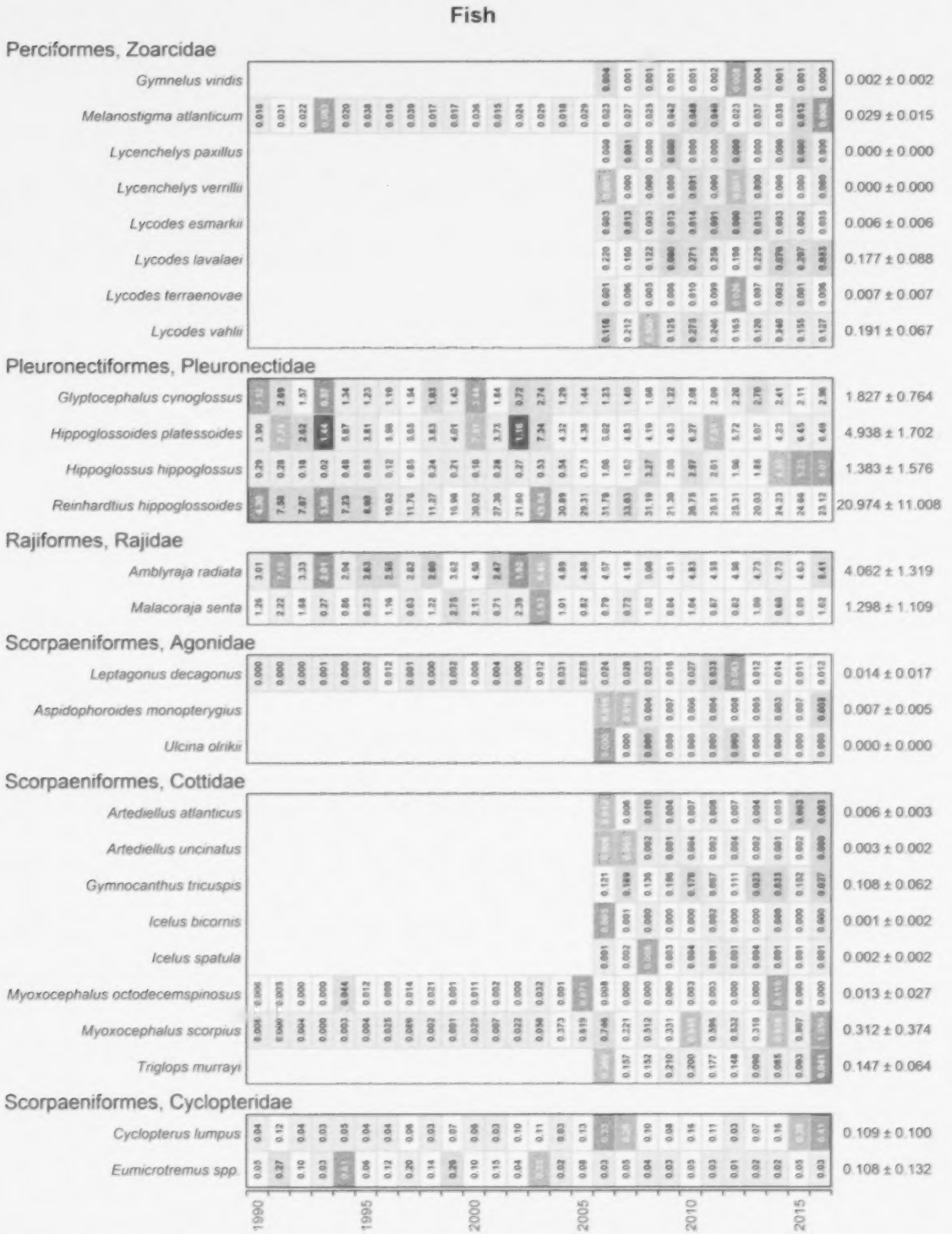

Figure 61. Continued.

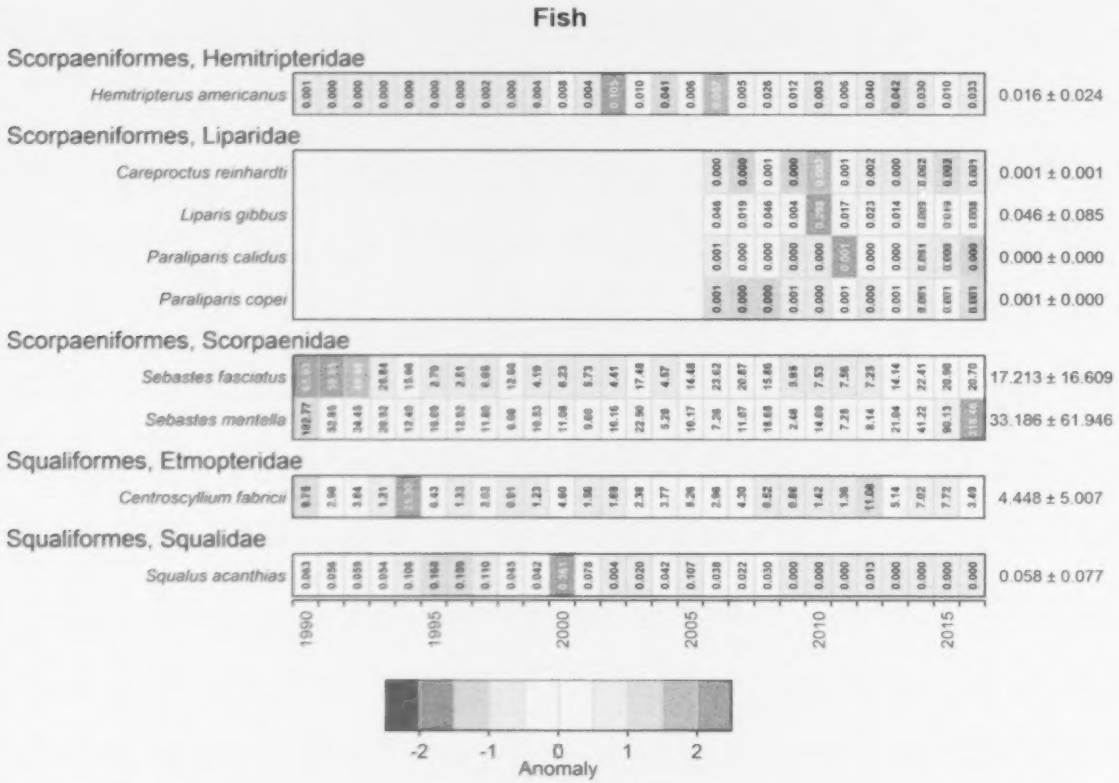

Figure 61. Continued.

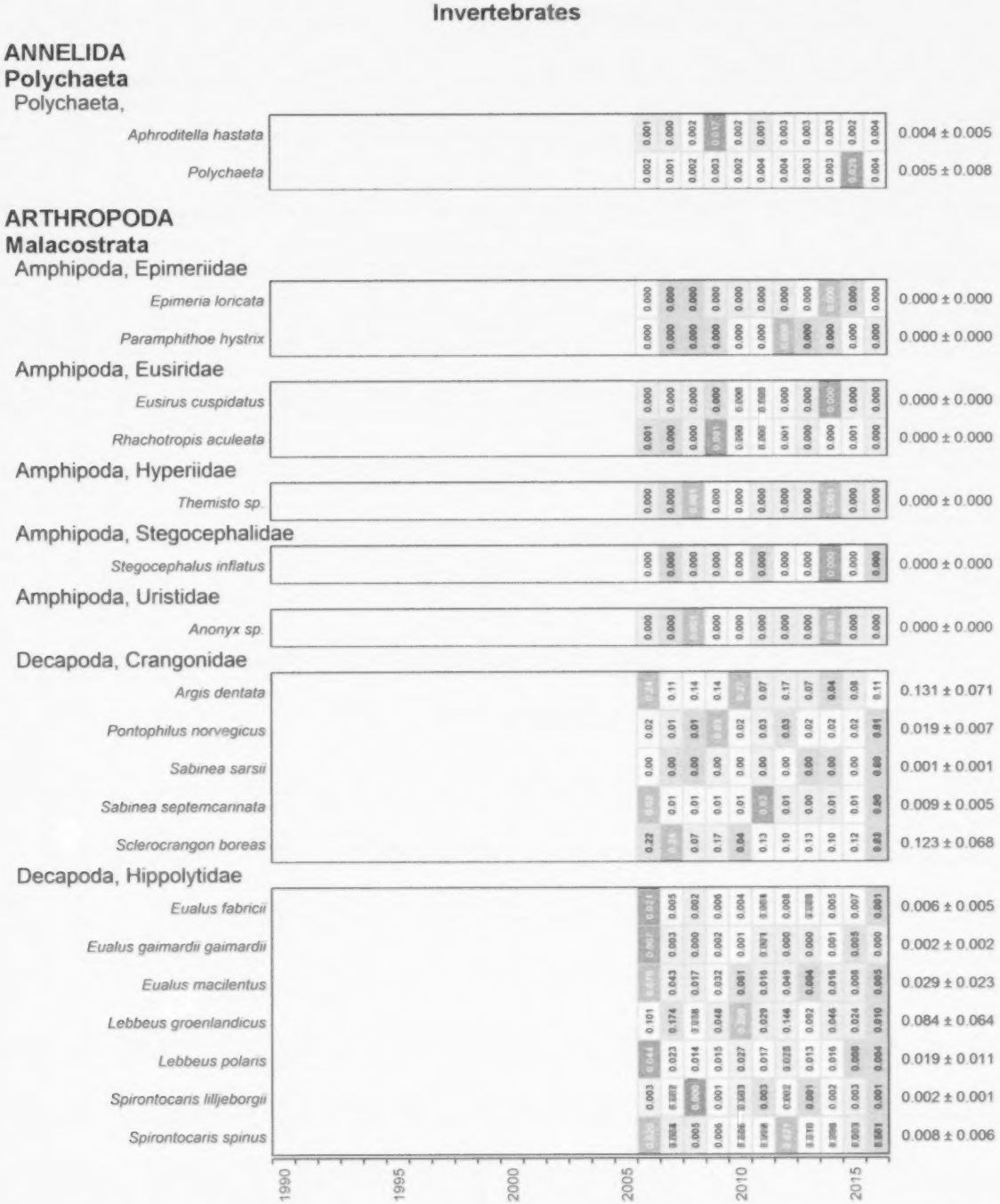

Figure 62. Average weight per 15-minute tow during the invertebrates. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

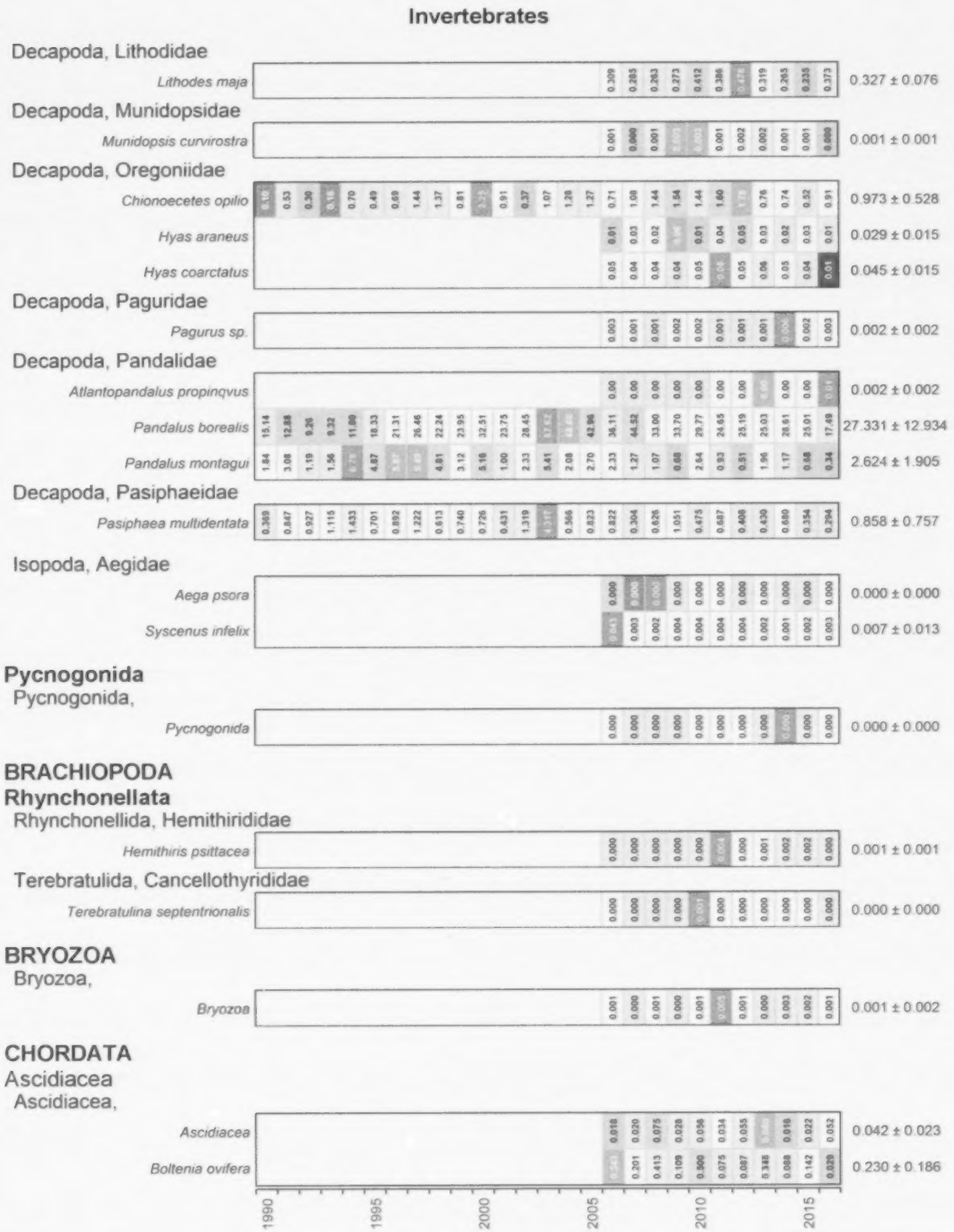

Figure 62. Continued.

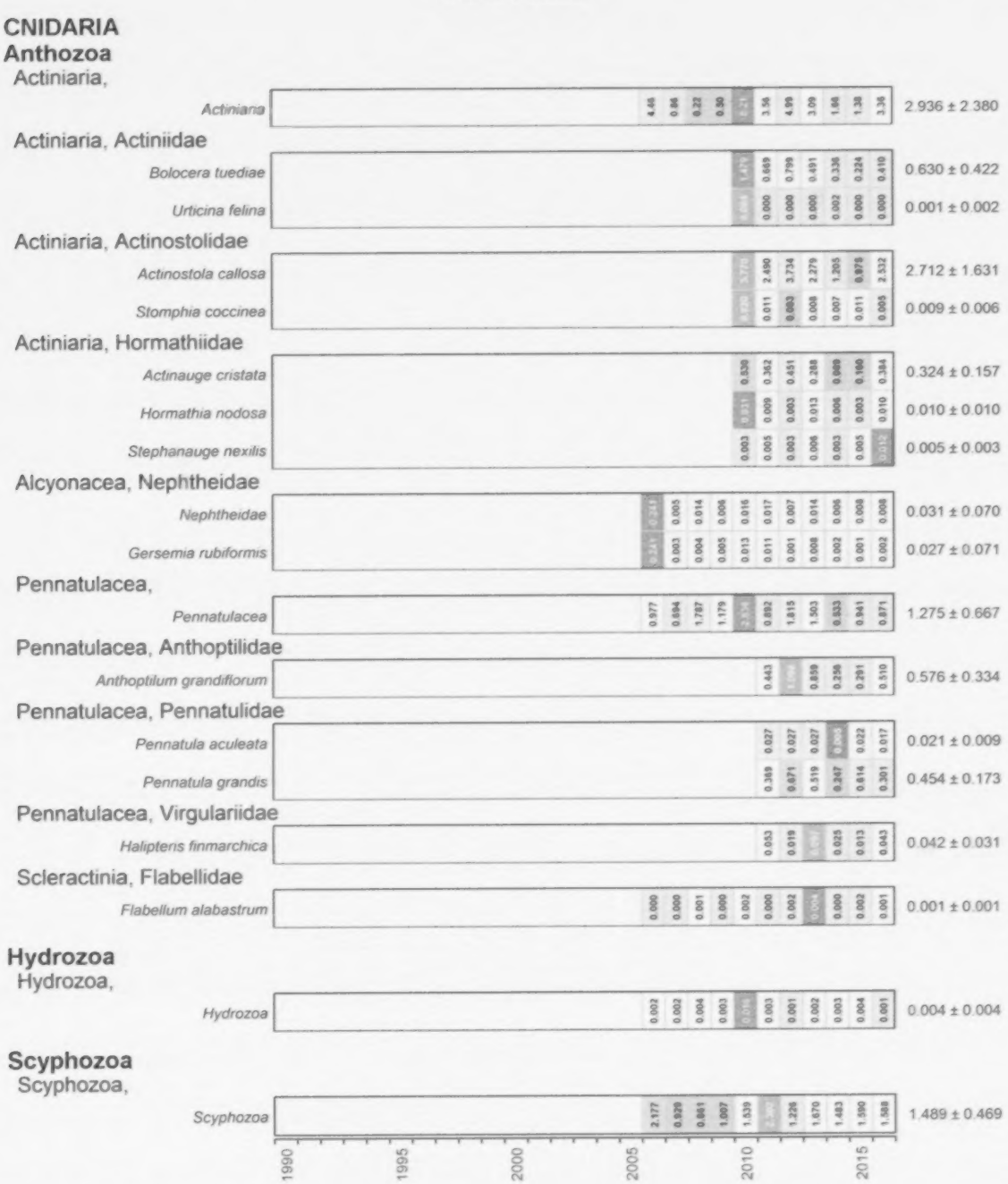

Figure 62. Continued.

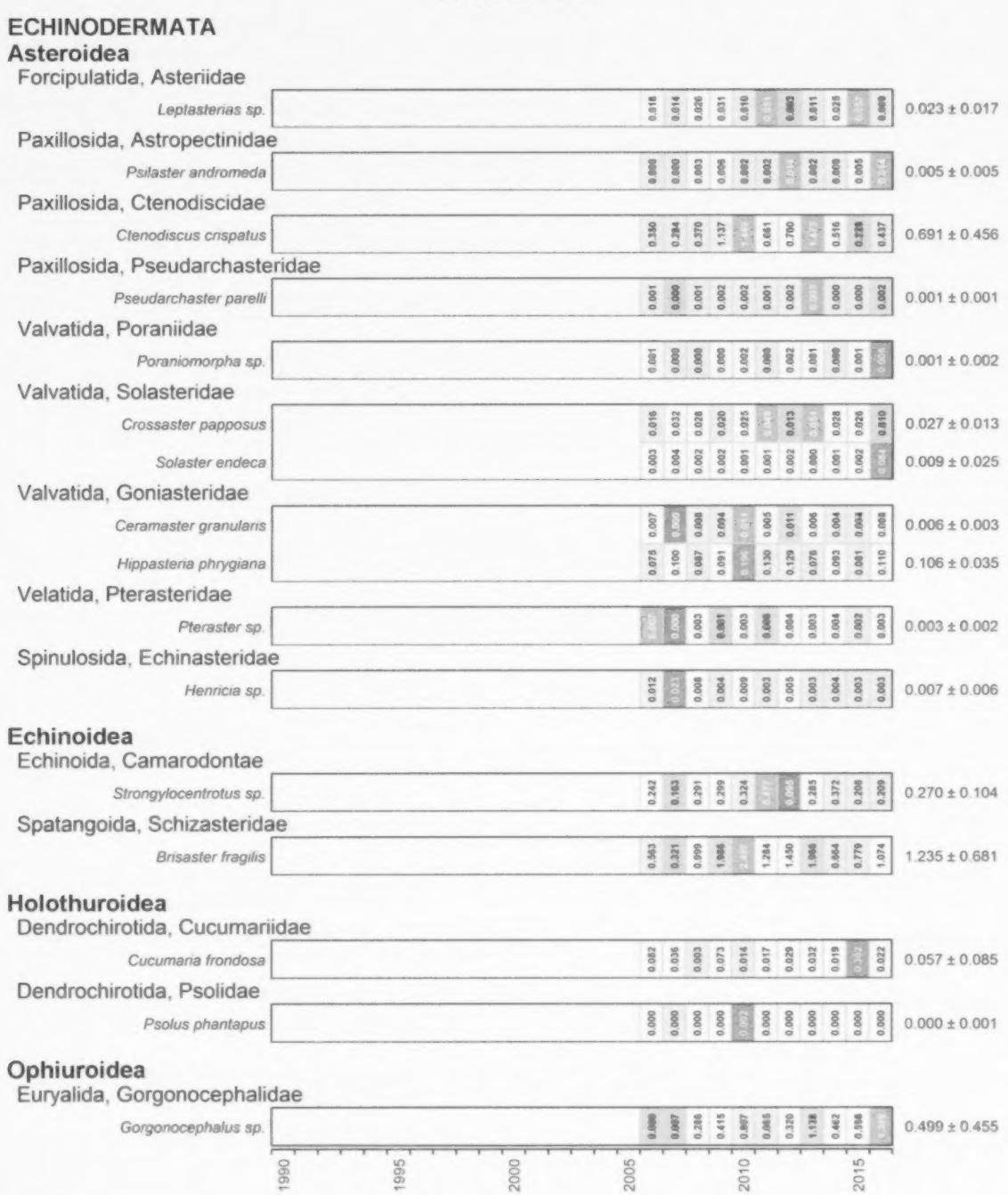

Figure 62. Continued.

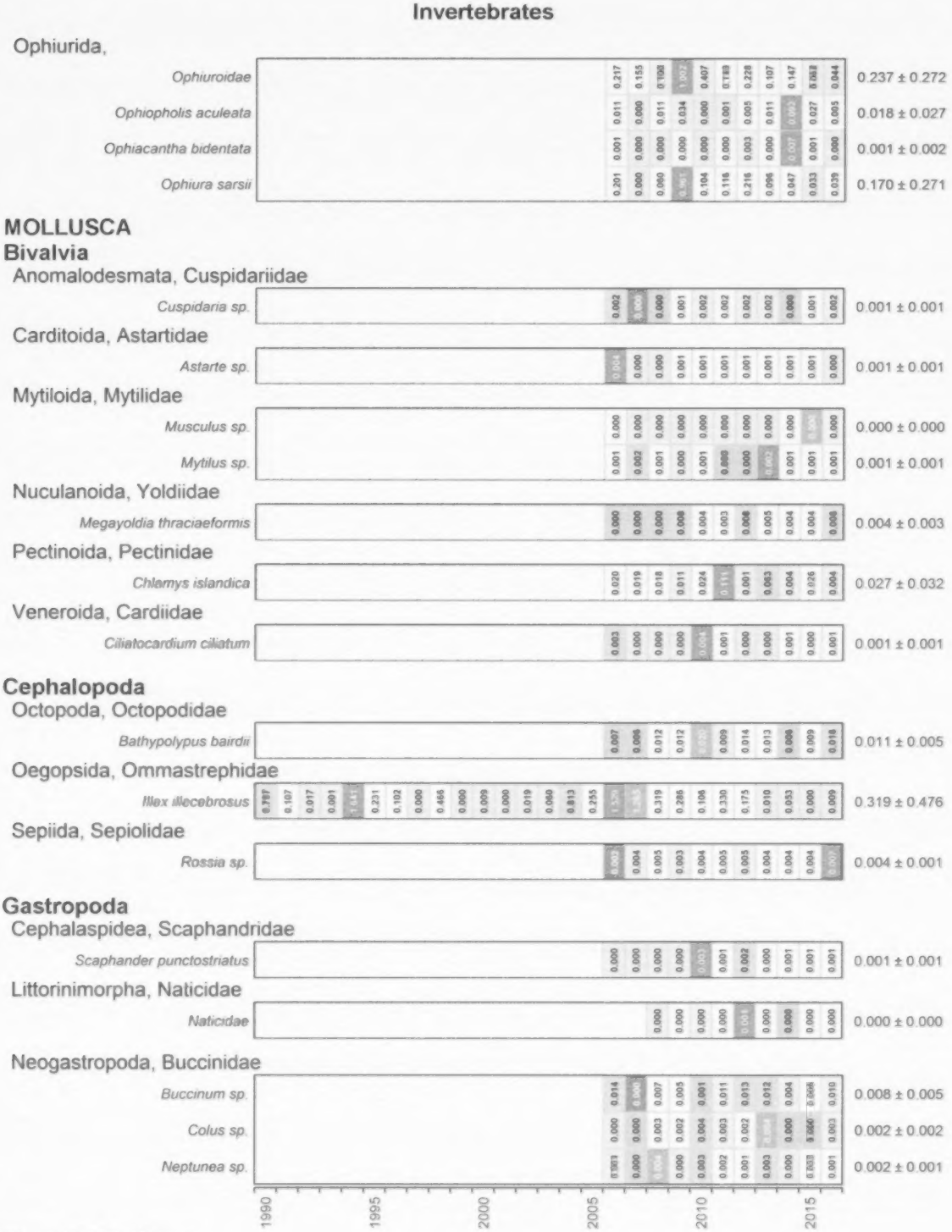

Figure 62. Continued.

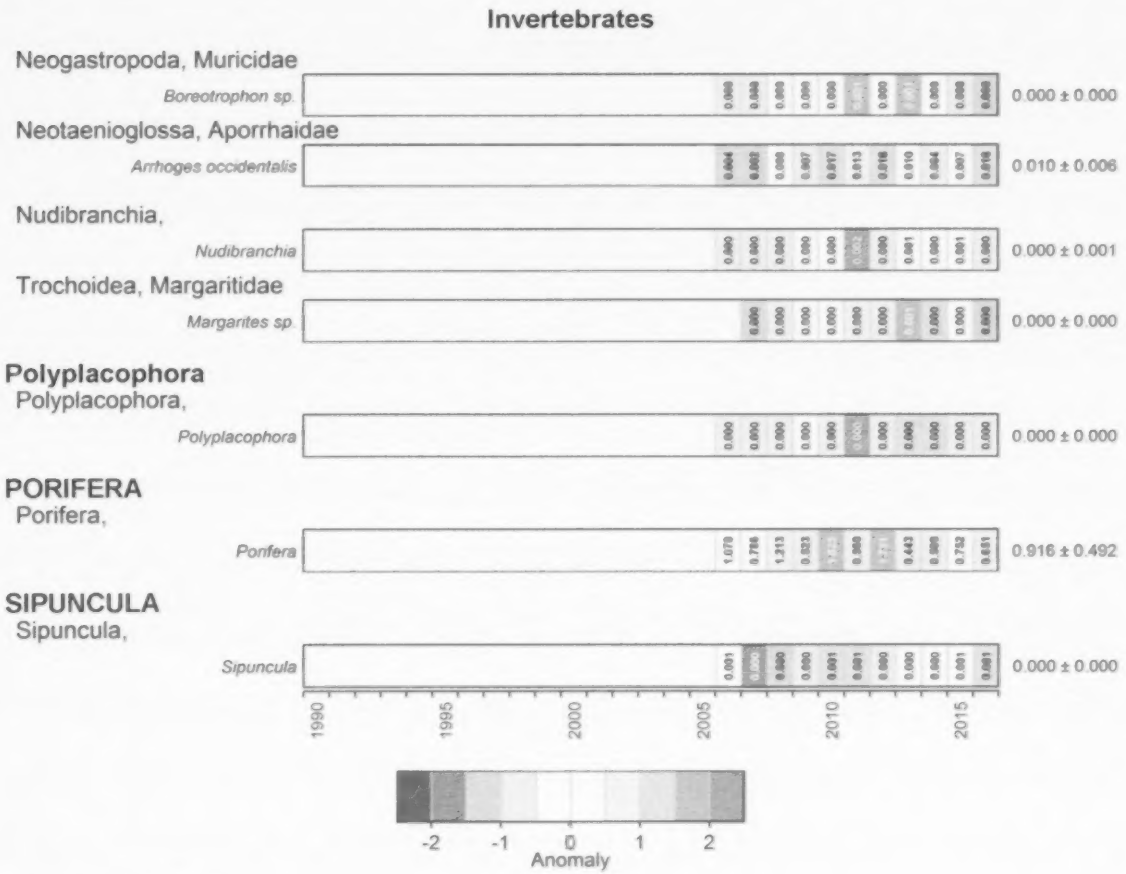

Figure 62. Continued.

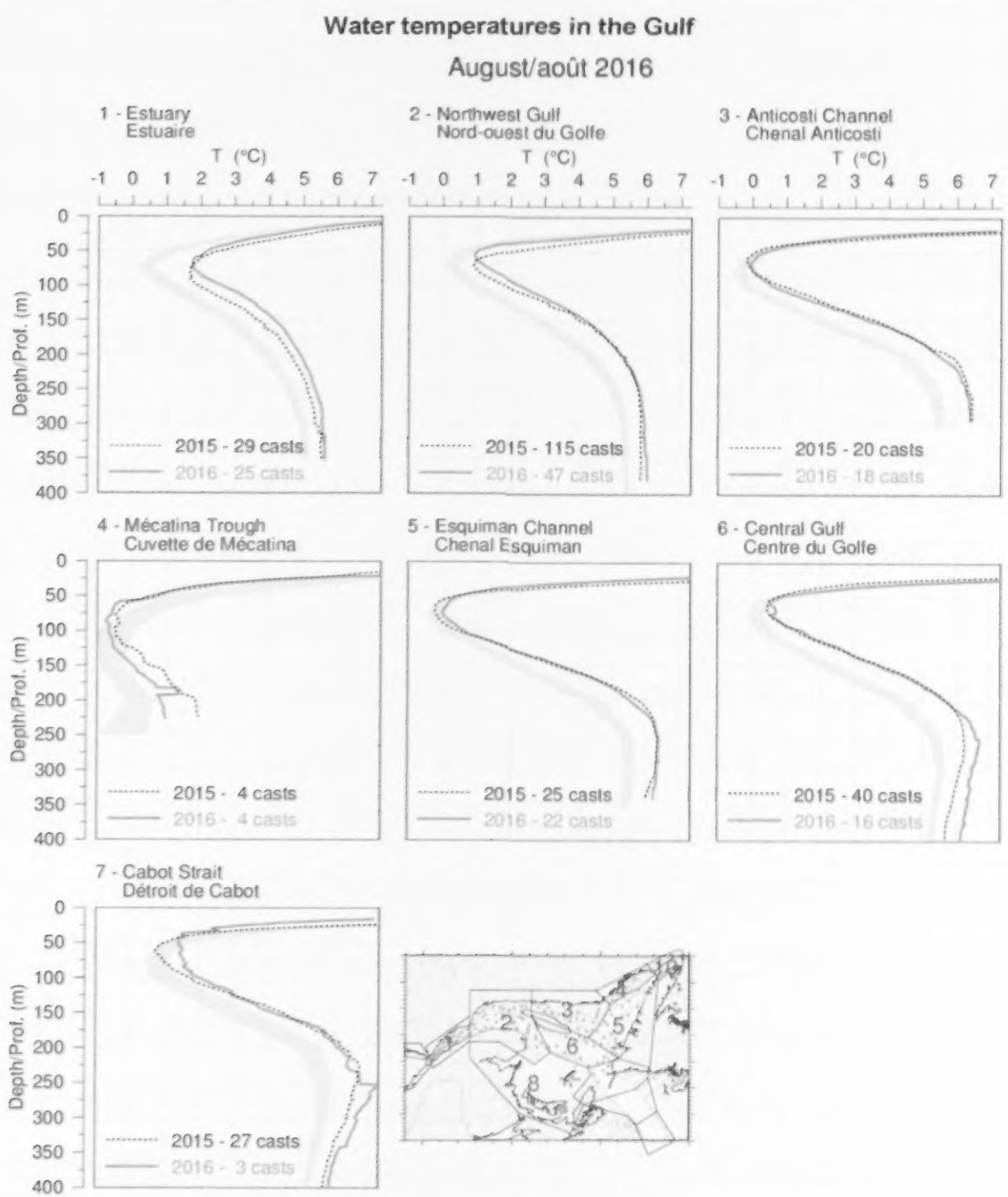

Figure 63. Mean temperature profiles observed in each region of the Gulf during August 2016. The shaded area represents the 1981–2010 climatological monthly mean ± 0.5 SD for August. Mean profiles for 2015 are also shown for comparison.

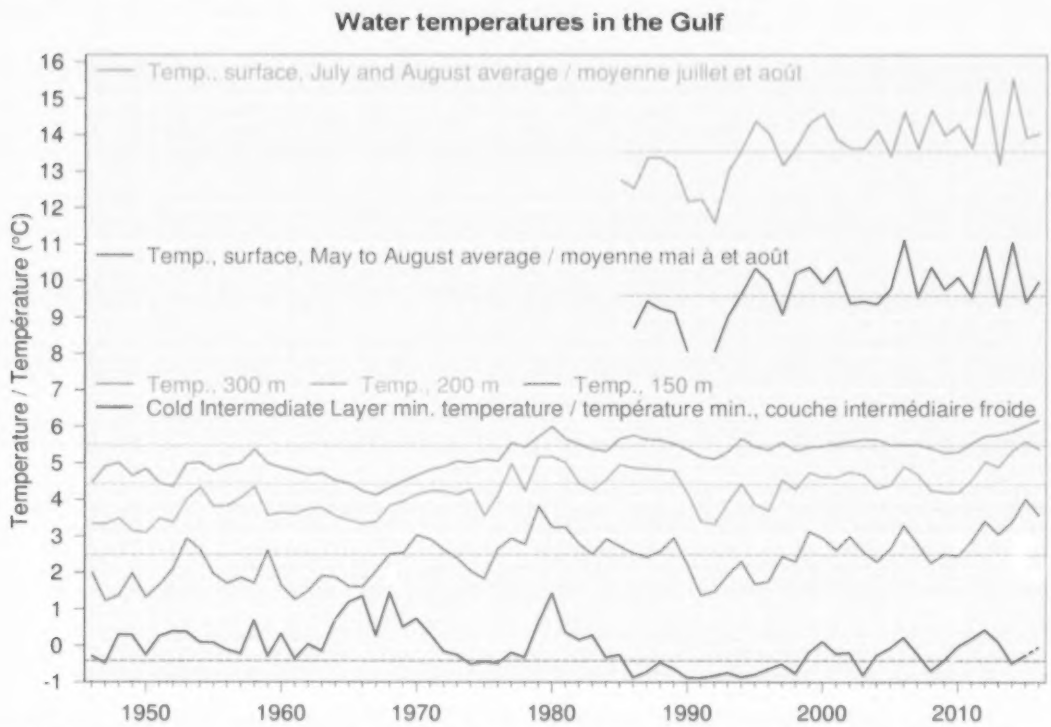

Figure 64. Water temperatures in the Gulf. Sea-surface temperature averaged over the Estuary and the northern Gulf for July–August and May-August (1985–2016) (red lines). Layer-averaged temperature for the Gulf of St. Lawrence at 150, 200 and 300 m (green lines). Cold intermediate layer minimum temperature index in the Gulf of St. Lawrence, adjusted to July 15 with 2016 value estimated from August survey data (blue line).

APPENDICES

Appendix 1. Number of successful stations per stratum for the DFO survey.

Strate	OPANO	Surface (km²)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
401	4T	545	3	4	4	4	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3	0	3	3	2	2	3	2
402	4T	909	3	5	5	3	3	1	3	2	3	5	3	3	3	2	0	3	3	3	3	3	3	3	3	3	2	3	2
403	4T	1190	3	3	3	3	3	3	10	10	3	5	3	3	3	3	6	4	3	3	3	3	3	3	3	2	2	3	2
404	4T	792	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3	0	3	3	3	2	3	2
405	4T	1478	3	3	3	3	3	3	3	2	4	4	4	3	3	3	2	9	3	3	3	3	3	3	3	3	2	3	2
406	4T	2579	5	3	3	3	3	3	5	5	3	5	3	4	5	3	5	6	4	4	4	3	3	3	4	3	3	4	4
407	4T	2336	5	3	3	3	3	3	3	3	2	3	3	3	3	5	3	5	3	3	3	3	0	3	3	2	4	4	2
408	4T	2734	4	5	5	3	2	3	3	2	5	5	4	3	3	3	2	11	4	4	4	4	3	3	4	3	4	4	2
409	4T	909	3	3	3	3	0	3	4	3	3	4	4	4	3	3	3	4	3	3	3	3	3	3	2	3	2	2	2
410	4T	1818	2	3	3	3	4	6	10	6	5	4	4	4	5	3	3	6	3	3	3	3	3	3	3	3	3	3	3
411	4T	1859	3	3	3	3	4	7	9	7	6	9	5	9	4	3	5	8	3	3	3	3	3	3	3	3	3	2	3
412	4T	1283	3	3	3	3	4	5	3	3	3	4	4	4	3	3	2	5	3	3	3	3	3	3	3	3	2	2	2
413	4T	731	3	4	3	3	0	3	3	4	3	4	4	4	3	3	1	5	3	3	3	3	3	3	3	3	2	2	2
414	4T	388	3	2	3	3	1	3	3	3	3	4	4	4	3	3	3	6	3	3	2	1	3	3	2	3	2	2	2
801	4R	1214	3	3	3	4	3	3	3	3	4	5	5	5	2	3	3	4	3	3	3	3	2	3	3	3	3	3	2
802	4R	1369	3	3	3	3	3	3	3	3	3	3	3	3	2	8	3	8	2	3	3	3	0	3	3	3	3	3	2
803	4S	6976	14	3	2	4	3	3	3	3	4	5	3	4	6	2	1	14	6	8	8	7	3	6	7	3	10	8	5
804	4S	2490	5	4	3	3	4	3	3	3	3	3	3	6	3	2	3	10	3	3	3	3	3	3	3	3	4	4	4
805	4S	5762	14	7	4	4	6	4	11	8	4	5	5	5	12	8	4	10	8	7	7	6	4	5	7	5	7	7	9
806	4S	2127	4	4	3	3	3	3	3	3	3	3	3	3	3	3	5	4	3	3	2	3	3	3	3	3	3	3	3
807	4S	2370	3	12	11	10	5	5	4	4	3	3	4	3	2	1	0	7	3	3	3	3	3	2	3	3	4	4	4
808	4S	2428	4	7	6	4	5	4	3	3	2	4	3	3	3	3	0	3	3	3	3	3	2	3	3	2	4	4	4
809	4R	1547	3	9	7	6	4	3	3	3	3	3	3	3	3	3	1	5	3	3	3	3	3	3	2	3	3	3	4
810	4R	765	3	4	5	4	3	3	3	3	4	4	4	4	6	5	3	8	3	3	4	3	0	3	3	2	3	2	2
811	4R	1506	3	4	4	4	5	3	8	6	3	3	3	3	3	3	3	7	3	3	3	2	2	2	3	2	2	2	2
812	4R	4648	7	9	8	11	4	3	3	3	3	3	3	3	3	3	4	5	5	4	5	4	5	3	5	3	8	7	6
813	4R	3958	6	6	5	9	3	4	6	5	7	4	6	8	2	5	3	9	5	3	5	3	4	4	6	3	6	6	4
814	4S	1029	3	4	4	4	3	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2
815	4S	4407	9	15	11	8	5	4	3	3	8	9	9	2	6	3	3	14	5	5	6	5	5	3	6	4	6	7	6
816	4S	5032	9	11	9	9	6	6	17	17	20	21	21	1	6	4	4	11	7	7	7	6	4	4	3	6	6	8	7
817	4S	3646	7	18	11	7	9	10	9	5	11	17	13	14	8	5	2	7	5	5	4	5	3	3	4	4	5	4	6
818	4S	2774	4	7	5	4	3	3	3	4	4	4	4	5	7	5	1	6	4	4	2	4	3	4	3	3	4	5	4
819	4S	1441	3	7	9	5	4	5	3	2	3	3	4	1	1	3	0	8	2	3	3	2	3	3	3	3	3	2	2
820	4R	1358	3	3	3	3	3	3	7	5	6	5	5	3	2	3	3	14	3	3	3	3	0	2	3	3	3	3	2
821	4R	1272	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3	7	3	3	3	3	2	4	3	3	3	2	2
822	4R	3245	6	4	3	2	3	3	6	4	10	8	10	9	3	3	3	8	4	4	4	3	4	2	4	2	5	3	4
823	4R	556	3	3	3	3	2	3	2	3	1	3	2	3	2	5	2	10	3	3	3	3	2	3	3	3	3	3	2
824	4R	837	3	1	3	1	3	3	3	3	3	3	2	3	2	2	3	6	3	3	3	3	2	3	3	2	2	2	1
827	4S	3231	0	1	1	1	3	3	0	2	3	1	3	0	2	2	3	6	4	4	3	3	3	2	3	2	2	3	3
828	4S	2435	4	1	2	2	3	3	3	3	3	1	0	1	0	3	3	1	3	3	3	3	3	2	2	2	2	2	2
829	4S	2692	3	2	3	3	3	3	3	0	3	3	2	0	2	1	0	8	4	4	3	2	3	2	2	3	2	4	3
830	4S	1917	3	3	4	3	3	3	2	2	3	3	3	2	1	1	0	6	3	3	3	3	3	3	2	3	2	4	4
831	4S	1204	3	0	2	3	3	3	3	2	3	4	3	3	1	3	3	4	3	3	3	3	3	3	2	2	2	2	2
832	4S	3962	4	12	11	7	7	9	8	5	3	3	3	3	2	3	4	8	4	5	5	3	4	3	6	4	4	4	3
833	4S	559	3	1	3	3	3	3	3	3	3	3	3	0	3	3	2	6	3	3	3	3	3	3	3	1	2	2	2
835	4R	2641	0	6	7	6	3	3	3	3	6	5	6	5	6	3	3	8	5	5	5	4	0	4	5	2	4	3	3
836	4R	3149	0	7	8	6	3	3	3	3	3	3	3	3	3	2	4	10	5	3	5	4	3	4	4	3	5	5	2
837	4R	2668	0	5	6	3	2	3	4	4	3	3	3	3	5	5	2	4	4	3	5	3	3	2	5	1	4	4	3
838	4R	3378	0	9	8	7	5	5	0	0	0	2	0	4	4	0	3	10	6	3	6	0	0	3	5	0	6	4	5
839	4S	4390	0	2	5	5	3	2	2	1	2	3	3	0	0	3	2	3	6	5	4	3	3	2	2	3	2	3	2
840	4R	765	0	3	3	1	1	0	0	0	0	0	0	2	0	0	0	5	3	0	3	0	0	1	3	0	2	3	2
841	4S	816	0	0	1	3	3	3	3	0	2	1	2	3	2	3	3	3	3	3	2	3	3	3	2	3	2	2	2
Total		116115	191	250	239	214	175	182	217	185	204	224	209	183	171	163	133	354	192	183	189	164	132	156	178	141	177	182	159
851	4T	456																			3	3	3	3	3	3	2	2	2
852	4T	427																			3	3	3	3	2	3	2	2	2
854	4T	465																			3	3	3	2	2	2	2	2	2
855	4T	928																			3	4	3	2	3	3	2	2	2

Appendix 2. Occurrences and total catches, in weight and number, by taxon during the 2016 survey (167 successful tows).

Vertebrates

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
90	*Amblyraja radiata*	Raie épineuse	Thorny Skate	138	928.1	1803
696	*Ammodytes* sp.	Lançons	Sand Lances	12	0.1	93
700	*Anarhichas lupus*	Loup atlantique	Atlantic Wolffish	28	67.6	185
701	*Anarhichas minor*	Loup tacheté	Spotted Wolffish	6	6.0	8
320	*Arctozenus risso*	Lussion blanc	White Barracudina	121	42.9	3494
193	*Argentina silus*	Grande argentine	Atlantic Argentine	15	2.1	36
811	*Artediellus atlanticus*	Hameçon atlantique	Atlantic Hookear Sculpin	32	0.9	108
810	*Artediellus* sp.	Hameçons	Hookear Sculpins	2	< 0.1	10
812	*Artediellus uncinatus*	Hameçon neigeux	Arctic Hookear Sculpin	7	0.1	19
838	*Aspidophoroides monopterygius*	Poisson-alligator atlantique	Alligatorfish	31	0.2	63
837	*Aspidophoroides olrikii*	Poisson-alligator arctique	Arctic Alligatorfish	4	< 0.1	16
102	*Bathyraja spinicauda*	Raie à queue épineuse	Spinytail Skate	2	11.7	2
451	*Boreogadus saida*	Saïda franc	Arctic Cod	9	0.8	43
865	*Careproctus reinhardti*	Petite limace de mer	Sea Tadpole	4	0.1	5
27	*Centroscyllium fabricii*	Aiguillat noir	Black Dogfish	20	495.7	691
150	*Clupea harengus*	Hareng atlantique	Atlantic Herring	111	1142.1	4119
829	*Cottunculus microps*	Cotte polaire	Polar Sculpin	3	0.1	4
721	*Cryptacanthodes maculatus*	Terrassier tacheté	Wrymouth	3	6.6	6
849	*Cyclopterus lumpus*	Grosse poule de mer	Lumpfish	51	49.3	83
208	*Cyclothone microdon*	Cyclothone à petites dents	Small-Toothed Bristlemouth	8	< 0.1	16
461	*Enchelyopus cimbrius*	Motelle à quatre barbillons	Fourbeard Rockling	111	52.2	1371
618	*Epigonus pandionis*	Cardinal	Big Eye	1	< 0.1	1
711	*Eumesogrammus praecisus*	Quatre-lignes atlantique	Fourline Snakeblenny	20	5.9	215
844	*Eumicrotremus spinosus*	Petite poule de mer atlantique	Atlantic Spiny Lumpsucker	25	3.5	192
845	*Eumicrotremus spinosus variabilis*	Petite poule de mer atlantique	Atlantic Spiny Lumpsucker	1	< 0.1	1
438	*Gadus morhua*	Morue franche	Atlantic Cod	119	5522.3	8272
439	*Gadus ogac*	Ogac, morue ogac	Greenland Cod	5	1.7	6
426	*Gasterosteus aculeatus aculeatus*	Épinoche à trois épines	Threespine Stickleback	2	< 0.1	3
890	*Glyptocephalus cynoglossus*	Plie grise	Witch Flounder	137	465.5	2559
205	Gonostomatidae	Cyclothones	Bristlemouths	1	< 0.1	8
746	*Gymnelus viridis*	Unernak caméléon	Fish Doctor	2	0.1	8
823	*Gymnocanthus tricuspis*	Tricorne arctique	Arctic Staghorn Sculpin	20	4.5	101
809	*Hemitripterus americanus*	Hémitriptère atlantique	Sea Sculpin	8	5.5	12
889	*Hippoglossoides platessoides*	Plie canadienne	American Plaice	141	981.2	9862

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
893	*Hippoglossus hippoglossus*	Flétan atlantique	Atlantic Halibut	50	770.3	114
832	*Icelus spatula*	Icèle spatulée	Spatulate Sculpin	7	0.3	27
285	*Lampadena speculigera*	Lanterne-miroir	Mirror Lanternfish	1	< 0.1	1
836	*Leptagonus decagonus*	Agone atlantique	Atlantic Poacher	17	5.6	200
717	*Leptoclinus maculatus*	Lompénie tachetée	Daubed Shanny	28	2.2	177
891	*Limanda ferruginea*	Limande à queue jaune	Yellowtail Flounder	4	8.2	37
862	*Liparis gibbus*	Limace marbrée	Variegated Snailfish	4	2.6	71
857	*Liparis* sp.	Limaces	Snailfishes	1	< 0.1	1
966	*Lophius americanus*	Baudroie d'Amérique	Monkfish, Goosefish	8	25.8	8
716	*Lumpenus lampretaeformis*	Lompénie-serpent	Snakeblenny	24	6.2	174
750	*Lycenchelys paxillus*	Lycode commune	Common Wolf Eel	3	0.1	3
752	*Lycenchelys verrillii*	Lycode à tête longue	Wolf Eelpout	5	< 0.1	5
727	*Lycodes esmarkii*	Lycode d'Esmark	Esmark's Eelpout	5	0.9	9
728	*Lycodes lavalaei*	Lycode du Labrador	Newfoundland Eelpout	11	7.5	68
733	*Lycodes polaris*	Lycode polaire	Canadian Eelpout	1	< 0.1	
734	*Lycodes terraenovae*	Lycode atlantique	Atlantic Eelpout	2	0.4	2
730	*Lycodes vahlii*	Lycode à carreaux	Vahl's Eelpout	41	39.7	571
91	*Malacoraja senta*	Raie lisse	Smooth Skate	116	166.2	766
187	*Mallotus villosus*	Capelan	Capelin	94	37.9	3042
441	*Melanogrammus aeglefinus*	Aiglefin	Haddock	4	4.7	5
745	*Melanostigma atlanticum*	Molasse atlantique	Atlantic Soft Pout	47	1.0	305
449	*Merluccius bilinearis*	Merlu argenté	Silver Hake	32	15.9	56
272	Myctophidae	Poissons-lanterne	Lanternfishes	21	1.5	457
819	*Myoxocephalus scorpius*	Chaboisseau à épines courtes	Shorthorn Sculpin	27	154.8	304
817	*Myoxocephalus* sp.	Chaboisseaux	Sculpins	1	< 0.1	2
12	*Myxine glutinosa*	Myxine du nord	Northern Hagfish	94	145.7	2826
368	*Nemichthys scolopaceus*	Avocette ruban	Atlantic Snipe Eel	1	< 0.1	1
278	*Neoscopelus macrolepidotus*	Lanterne à grandes écailles	Glowingfish	1	< 0.1	1
478	*Nezumia bairdii*	Grenadier du grand Banc	Common Grenadier	87	71.5	8505
275	*Notoscopelus elongatus*	Lanterne-voilière nordique	Kroyer's Lanternfish	3	0.2	9
856	*Paraliparis copei copei*	Limace à museau noir	Blacksnout Seasnail	4	0.1	10
444	*Phycis chesteri*	Merluche à longues nageoires	Longfin Hake	25	37.4	328
443	*Pollachius virens*	Goberge	Pollock	1	2.5	1
222	*Polyipnus clarus*	Hache	Slope Hachetfish	1	< 0.1	1
892	*Reinhardtius hippoglossoides*	Flétan du Groenland, turbot	Greeenland Halibut, Turbot	122	4020.3	14558
572	*Scomber scombrus*	Maquereau bleu	Atlantic Mackerel	5	2.9	20
398	*Scomberesox saurus saurus*	Balaou	Atlantic Saury	6	0.5	6
796	*Sebastes fasciatus*	Sébaste acadien	Acadian Redfish	113	3249.8	36970

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
794	*Sebastes mentella*	Sébaste atlantique	Deepwater Redfish	135	50026.2	679625
793	*Sebastes norvegicus*	Sébaste orangé	Golden Redfish	1	31.6	18
814	*Triglops murrayi*	Faux-trigle armé	Moustache Sculpin	35	7.1	657
447	*Urophycis tenuis*	Merluche blanche	White Hake	82	386.4	781
	Total	**Vertébrés**	**Vertebrates**		69 031	784 137

Invertebrates

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
1100		Invertébrés	Invertebrates	1	0.1	
2182	*Actinauge cristata*	Anémone de mer	Anemone	50	76.4	6049
2165	Actiniaria	Actinies et Anémones	Sea Anemones	8	0.2	14
2162	*Actinostola callosa*	Anémones de mer	Anemone	61	567.9	5351
6771	*Aega psora*	Isopode	Isopod	12	< 0.1	19
2675	*Alcyonidium* sp.	Bryozoaire	Bryozoan	1	< 0.1	1
6996	*Ampelisca* sp.	Gammaride	Amphipod	1	< 0.1	1
8593	*Amphiura* sp.	Ophiures	Brittle Star	9	< 0.1	20
4219	*Anomia* sp.	Anomies	Jingle Shells	2	< 0.1	5
7389	*Anonyx* sp.	Gammarides	Gammarids	6	< 0.1	10
3977	*Antalis* sp.	Scaphopode	Tuskshell	1	< 0.1	1
2218	*Anthoptilum grandiflorum*	Plume de mer	Sea Pen	55	59.6	4271
5002	*Aphroditella hastata*	Souris de mer	Sea Mouse	12	0.8	20
6594	*Arcoscalpellum michelottianum*	Balane	Barnacle	4	< 0.1	4
8138	*Argis dentata*	Crevette verte	Arctic Argid	29	31.2	4777
3418	*Arrhoges occidentalis*	Pied-de-pélican	American Pelicanfoot	15	2.2	202
8680	Ascidiacea	Ascidies, tuniqués sessiles	Ascidians, Sessile Tunicates	88	8.2	1874
1120	*Asconema foliatum*	Éponge	Sponge	1	2.6	
4227	*Astarte* sp.	Astartes	Astartes	17	0.1	26
8396	*Asterias rubens*	Astérie boréale commune	Purple Seastar	1	< 0.1	1
8390	Asteroidea	Étoiles de mer	Sea Stars	1	< 0.1	1
8113	*Atlantopandalus propinqvus*	Crevette	Shrimp	14	0.8	163
2097	*Atolla wyvillei*	Méduse	Jellyfish	4	0.3	4
3583	*Aulacofusus brevicauda*	Buccin	Whelk	1	< 0.1	1
2085	*Aurelia aurita*	Méduse de lune	Moon Jelly	8	0.6	9
6595	Balanidae	Balanes	Barnacles	7	< 0.1	59
4102	*Bathyarca* sp.	Bivalves	Bathyarks	1	< 0.1	1

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
4904	*Bathypolypus bairdii*	Poulpe	North Atlantic Octopus	44	3.3	71
3995	Bivalvia	Bivalves	Bivalves	1	< 0.1	2
2158	*Bolocera tuediae*	Anémone de mer	Anemone	77	73.1	973
8793	*Boltenia echinata*	Cactus de mer	Cactus Sea Squirt	2	< 0.1	5
8792	*Boltenia ovifera*	Patate de mer	Sea Potato	8	6.5	56
7933	*Boreomysis* sp.	Mysidacés	Mysids	1	< 0.1	2
8798	*Botrylloides* sp.	Ascidie	Tunicate	2	< 0.1	2
5755	*Brada inhabilis*	Polychète	Flabelligerid Worm	2	< 0.1	2
8378	*Brisaster fragilis*	Oursin coeur	Heart Urchin	78	195.3	28859
2670	Bryozoa	Bryozoaires	Bryozoans	7	< 0.1	16
3523	*Buccinum scalariforme*	Buccin	Ladder Whelk	9	0.4	22
3516	*Buccinum* sp.	Buccins	Whelk	25	2.2	169
3517	*Buccinum undatum*	Buccin commun	Waved Whelk	6	0.2	9
8173	*Calocaris templemani*	Crevette fouisseuse	Lobster Shrimp	1	< 0.1	1
8206	*Cancer irroratus*	Crabe commun	Common Rock Crab	1	< 0.1	1
7881	Caprellidae	Caprellidés	Skeleton Shrimp	1	< 0.1	1
8429	*Ceramaster granularis*	Étoile de mer	Sea Star	28	1.2	51
8213	*Chionoecetes opilio*	Crabe des neiges	Snow Crab	78	379.2	1083
6593	*Chirona hameri*	Balane turbané	Turban Barnacle	5	0.6	39
4167	*Chlamys islandica*	Pétoncle d' Islande	Iceland Scallop	10	0.8	23
4351	*Ciliatocardium ciliatum*	Coque d'Islande	Iceland Cockle	8	0.7	27
1340	Cnidaria	Cnidaires	Cnidarians	2	< 0.1	2
3908	*Colga villosa*	Nudibranche	Nudibranch	2	< 0.1	2
3577	*Colus pubescens*	Buccin	Hairy Whelk	6	0.1	10
3575	*Colus* sp.	Buccins	Whelks	1	< 0.1	1
3576	*Colus stimpsoni*	Buccin	Whelk	4	0.4	16
8447	*Crossaster papposus*	Soleil de mer épineux	Spiny Sun Star	23	1.6	54
8407	*Ctenodiscus crispatus*	Étoile de mer	Mud Star	103	87.2	22242
2250	Ctenophora	Cténophores	Comb-Jellies	1	< 0.1	1
8312	*Cucumaria frondosa*	Concombre de mer	Orange Footed Sea Cucumbe	6	3.4	13
4525	*Cuspidaria* sp.	Myes	Dipperclams	16	0.2	23
2080	*Cyanea capillata*	Crinière de lion	Lion's Mane	85	76.5	200
3894	*Dendronotus frondosus*	Nudibranche	Nudibranch	2	< 0.1	2
8408	*Diplopteraster multipes*	Étoile de mer	Sea Star	5	1.5	7
3965	*Doridoxa ingolfiana*	Nudibranche	Nudibranch	1	< 0.1	1
2191	*Drifa glomerata*	Corail mou	Soft Coral	24	0.3	52
2183	*Duva florida*	Corail mou	Sea Cauliflower	14	0.6	29
8373	*Echinarachnius parma*	Dollar de sable	Common Sand Dollar	3	0.4	23

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
4010	*Ennucula tenuis*	bivalve	Smooth Nutclam	1	< 0.1	1
7383	*Epimeria loricata*	Gammaride	Gammarid	3	< 0.1	7
2157	*Epizoanthus* sp.	Anémone de mer	Sea Anemone	39	0.1	390
8075	*Eualus fabricii*	Bouc Arctique	Arctic Eualid	4	0,1	117
8081	*Eualus gaimardii belcheri*	Bouc	Circumpolar Eualid	2	< 0.1	4
8080	*Eualus gaimardii gaimardii*	Bouc	Circumpolar Eualid	9	0.1	104
8077	*Eualus macilentus*	Bouc du Groenland	Greenland Shrimp	9	1.5	1486
8074	*Eualus* sp.	Bouc	Eualid	1	< 0.1	
8778	*Eudistoma vitreum*	Ascidie	Tunicate	10	0.2	24
5461	*Euphrosine borealis*	Polychète	Seaworm	1	< 0.1	1
8033	*Eusergestes arcticus*	Crevette	Shrimp	8	0.1	78
7195	*Eusirus cuspidatus*	Gammaride	Gammarid	3	< 0.1	3
3437	*Euspira pallida*	Lunatie du Groenland	Pale Moonsnail	7	0.1	15
2295	Fecampiidae	Vers flats	Flatworms	3	< 0.1	3
2224	*Flabellum alabastrum*	Madrépore	Cup Coral	5	0.2	22
3175	Gastropoda	Gastéropodes	Gastropods	1	< 0.1	1
2184	*Gersemia rubiformis*	Corail mou	Sea Strawberry	17	0.2	43
5902	*Golfingia margaritacea*	Sipunculide	Sipunculid	5	0.1	15
8540	*Gorgonocephalus* sp.	Gorgonocéphales	Basket Stars	24	130.0	689
2217	*Halipteris finmarchica*	Plume de mer	Sea Pen	31	7.2	434
8797	*Halocynthia pyriformis*	Pêche de mer	Sea Peach	1	< 0.1	2
5934	*Hamingia arctica*	Échiure	Echiurid	4	0.1	6
8263	*Heliometra glacialis*	Lis de mer	Feather Star	2	< 0.1	20
3090	*Hemithiris psittacea*	Brachiopode	Lamp Shell	4	< 0.1	11
8483	*Henricia* sp.	Étoiles de mer	Sea Stars	48	0.6	112
4437	*Hiatella arctica*	Saxicave arctique	Arctic Saxicave	3	< 0.1	3
8431	*Hippasteria phrygiana*	Étoile de mer	Sea Star	38	19.4	66
8290	Holothuroidea	Cocombres de mer	Sea Cucumbers	2	< 0.1	2
2167	*Hormathia nodosa*	Anémone noduleuse	Rugose Anemone	3	0.9	18
8217	*Hyas araneus*	Crabe lyre	Atlantic Lyre Crab	13	2.9	51
8218	*Hyas coarctatus*	Crabe lyre	Arctic Lyre Crab	29	2.6	138
1341	Hydrozoa	Hydrozoaires	Hydrozoans	32	0.1	199
6977	*Hyperia galba*	Hypéride	Hyperiid	2	< 0.1	2
4753	*Illex illecebrosus*	Encornet rouge nordique	Northern Shortfin Squid	19	1.6	32
5003	*Laetmonice filicornis*	Polychète	Seaworm	15	< 0.1	29
8092	*Lebbeus groenlandicus*	Bouc	Spiny Lebbeid	10	2.3	511
8095	*Lebbeus microceros*	Bouc	Shrimp	1	< 0.1	1
8093	*Lebbeus polaris*	Bouc	Polar Lebbeid	36	0.6	385

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8091	*Lebbeus* sp.	Boucs	Lebbeids	1	< 0.1	
8511	*Leptasterias polaris*	Étoile de mer polaire	Polar Sea Star	5	1.2	11
8510	*Leptasterias* sp.	Étoiles de mer	Sea Stars	14	< 0.1	23
8521	*Leptychaster arcticus*	Stellérídé	Sea Star	4	< 0.1	8
2207	*Liponema multicorne*	Anémone	Sea Anemone	9	1.3	22
8196	*Lithodes maja*	Crabe épineux du Nord	Norway King Crab	60	60.3	155
4395	*Macoma calcarea*	Bivalve	Chalky Macoma	5	< 0.1	26
3219	*Margarites costalis*	Margarite rosé du Nord	Boreal Rosy Margarite	2	< 0.1	3
7994	*Meganyctiphanes norvegica*	Euphauside	Horned Krill	1	< 0.1	2
4025	*Megayoldia thraciaeformis*	Bivalve	Broad Yoldia	29	1.6	336
2171	*Metridium senile*	Anémone de mer	Clonal Plumose Anemone	2	0.4	6
8322	*Molpadia oolitica*	Holothurie	Sea Cucumber	4	0.1	6
8164	*Munidopsis curvirostra*	Munidopsis curvirostra	Squat Lobster	15	< 0.1	69
4127	*Musculus niger*	Moule noire	Black Mussel	1	< 0.1	1
4126	*Musculus* sp.	Moules	Mussels	2	< 0.1	2
4121	*Mytilus* sp.	Moules	Mussels	12	0.5	54
3000	Nemertea	Némerte	Ribbon Worm	5	< 0.1	7
7483	*Neohela monstrosa*	Gammaride	Gammarid	3	< 0.1	4
2219	Nephtheidae	Coraux mous	Soft Corals	6	< 0.1	6
5113	*Nephtys* sp.	Polychète errante	Red-Lined Worm	2	< 0.1	2
3566	*Neptunea decemcostata*	Neptunée à dix côtes	Wrinkle Whelk	3	0.1	3
3565	*Neptunea* sp.	Buccins	Whelks	4	0.2	5
8448	*Novodinia americana*	Étoile de mer	Sea Star	2	1.9	5
4019	*Nuculana* sp.	Bivalves	Nutclams	2	< 0.1	2
5961	*Nymphon* sp.	Araignées de mer	Sea Spiders	19	< 0.1	32
3455	*Onchidiopsis* sp.	Gastéropode velutinidae	Snail	1	0.1	1
8575	*Ophiacantha bidentata*	Ophiure épineuse	Brittle Star	15	< 0.1	59
8583	*Ophiopholis aculeata*	Ophiure paquerette	Daisy Brittle Star	52	0.8	543
8585	*Ophioscolex glacialis*	Ophiure	Brittle Star	12	< 0.1	26
8553	*Ophiura sarsii*	Ophiure	Brittle Star	55	16.2	9846
8530	Ophiuroidea	Ophiures	Brittle Stars	2	< 0.1	2
8178	*Pagurus* sp.	Bernard hermite droitier	Hermit Crab	13	0.2	38
8111	*Pandalus borealis*	Crevette nordique	Northern Shrimp	143	3200.7	538724
8112	*Pandalus montagui*	Crevette ésope	Striped Pink Shrimp	79	71.3	22760
4438	*Panomya norvegica*	Saxicave	Arctic Roughmya	1	< 0.1	1
7586	*Paramphithoe hystrix*	Gammaride	Gammarid	2	< 0.1	2
7594	*Pardalisca abyssi*	Gammaride	Gammarid	2	< 0.1	2
8057	*Pasiphaea multidentata*	Sivade rose, Crevette blanche	Pink Glass Shrimp	85	42.1	16708

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8056	*Pasiphaea tarda*	Sivade	Crimson Pasiphaeid	2	< 0.1	3
2203	*Pennatula aculeata*	Plume de mer	Sea Pen	91	3.0	1146
2210	*Pennatula grandis*	Plume de mer	Sea Pen	37	46.6	1374
2096	*Periphylla periphylla*	Méduse à coronne	Crown Jellyfish	80	160.5	182
5907	*Phascolion strombus strombus*	Sipunculide	Hermit Sipunculid	2	< 0.1	12
2255	*Pleurobrachia pileus*	Groseille de mer ronde	Sea Gooseberry	28	0.2	126
3578	*Plicifusus kroeyeri*	Colus	Arctic Whelk	1	< 0.1	2
4950	Polychaeta	Polychètes	Polychaetes	81	0.6	461
1109	*Polymastia* sp.	Éponge	Sponge	5	0.2	30
5007	Polynoidae	Polychète errante	Fifteen-Scaled Worm	2	< 0.1	5
5264	*Polyphysia crassa*	Polychète	Sea Worm	4	< 0.1	8
8135	*Pontophilus norvegicus*	Crevette	Norwegian Shrimp	54	1.5	716
8435	*Poraniomorpha* sp.	Étoile de mer	Sea Star	10	0.7	23
1101	Porifera	Éponges	Sponges	113	94.4	
8433	*Pseudarchaster parelii*	Étoile de mer	Sea Star	13	0.5	24
8520	*Psilaster andromeda*	Étoile de mer	Sea Star	11	1.8	185
8294	*Psolus phantapus*	Holothurie	Sea Cucumber	4	< 0.1	4
8410	*Pteraster militaris*	Étoile de mer	Sea Star	10	0.3	23
8411	*Pteraster pulvillus*	Étoile de mer	Sea Star	6	< 0.1	6
1353	*Ptychogena lactea*	Méduse	Jellyfish	65	0.9	193
5951	Pycnogonida	Araignées de mer	Sea Spiders	2	< 0.1	3
1107	*Radiella hemisphaerica*	Éponge	Sponge	8	0.4	35
2681	*Reteporella grimaldii*	Bryozoaires marins	Marine Bryozoans	2	< 0.1	2
7211	*Rhachotropis aculeata*	Gammaride	Gammarid	6	< 0.1	28
4557	*Rossia* sp.	Sépioles	Bobtails	41	0.9	76
8129	*Sabinea sarsii*	Crevette	Sars Shrimp	7	0.1	39
8128	*Sabinea septemcarinata*	Crevette	Sevenline Shrimp	21	0.7	330
3491	*Scabrotrophon fabricii*	Murex	Murex	5	< 0.1	7
3715	*Scaphander punctostriatus*	Céphalaspide	Giant Canoe Bubble	11	0.1	52
8119	*Sclerocrangon boreas*	Crevette de roche	Scultured Shrimp	12	5.7	598
2040	Scyphozoa	Scyphozoaires	Scyphozoans	19	1.8	24
2679	*Securiflustra securifrons*	Bryozoaires marins	Marine Bryozoans	8	0.1	77
8035	*Sergia robusta*	Sergistidé écarlate	Scarlet Sergestid	2	< 0.1	2
4352	*Serripes groenlandicus*	Coque du Groenland	Greenland Smoothcockle	1	< 0.1	1
5900	Sipuncula	Sipunculides	Sipunculids	6	< 0.1	6
3225	*Solariella* sp.	Gastéropes	Topsnail	1	< 0.1	1
3227	*Solariella varicosa*	Gastéropode	Varicose Solarelle	1	< 0.1	1
8445	*Solaster endeca*	Soleil de mer pourpre	Purple Sunstar	6	5.1	17

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8087	*Spirontocaris liljeborgii*	Bouc épineux	Friendly Blade Shrimp	21	0.1	64
8084	*Spirontocaris* sp.	Bouc	Blade Shrimp	3	< 0.1	4
8085	*Spirontocaris spinus*	Bouc perroquet	Parrot Shrimp	17	0.3	174
1352	*Staurostoma mertensii*	Méduse à croix blanche	Whitecross Jellyfish	4	< 0.1	5
7750	*Stegocephalus inflatus*	Gammaride	Gammarid	2	< 0.1	2
8515	*Stephanasterias albula*	Étoile de mer	Sea Star	3	< 0.1	5
2159	*Stephanauge nexilis*	Anémone de mer	Sea Anemone	25	1.8	150
2173	*Stomphia coccinea*	Anémone marbrée	Anemone	28	0.4	60
8363	*Strongylocentrotus* sp.	Oursins	Sea Urchins	48	30.1	1255
1112	*Stylocordyla borealis*	Éponge	Sponge	16	0.1	170
6791	*Syscenus infelix*	Isopode	Isopod	54	0.4	242
1108	*Tentorium semisuberites*	Éponge	Sponge	2	< 0.1	12
3101	*Terebratulina septentrionalis*	Térébratule du Nord	Northern Lamp Shell	10	< 0.1	13
4498	*Teredo navalis*	Taret commun	Naval Shipworm	2	< 0.1	7
6972	*Themisto libellula*	Hypéride	Hyperiid	7	< 0.1	13
1357	*Thuiaria thuja*	Hydrozoaire	Bottlebrush Hydroid	12	< 0.1	22
8446	*Tremaster mirabilis*	Étoile de mer	Sea Star	1	0.1	1
4451	*Xylophaga atlantica*	Bivalve	Atlantic Woodeater	4	< 0.1	24
9999		Inconnu	Unknown	24	0.3	38
	Total	**Invertebrés**	**Invertebrates**		5 516	679 586

Others

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
9995		Déchets	Trash	165	83.5	
9970		Capsule de raies	Skates Egg	54	2.8	197

**: Codes for vertebrates and invertebrates used by the Quebec Region of DFO (Miller and Chabot 2014).*

Appendix 3. Number of measured and weighed specimens and descriptive statistics for the length in 2015.

Vertebrates

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1	Median	P99	Max
90	*Amblyraja radiata*	1521	1195	10.0	11.4	27.1	63.9	73.1
696	*Ammodytes* sp.	34	32	5.0	5.0	6.2	16.8	16.8
700	*Anarhichas lupus*	185	184	7.6	9.2	22.6	70.7	82.5
701	*Anarhichas minor*	8	8	9.3	9.3	39.5	63.1	63.1
320	*Arctozenus risso*	1953	916	12.5	17.2	22.0	27.0	29.6
193	*Argentina silus*	36	36	8.6	8.6	16.9	31.2	31.2
811	*Artediellus atlanticus*	108	103	3.1	4.0	7.6	13.9	14.1
810	*Artediellus* sp.	10	10	5.6	5.6	6.3	6.9	6.9
812	*Artediellus uncinatus*	19	19	5.5	5.5	7.1	8.8	8.8
838	*Aspidophoroides monopterygius*	63	61	8.8	8.8	12.9	15.1	15.1
837	*Aspidophoroides olrikii*	16	16	6.3	6.3	8.4	9.6	9.6
102	*Bathyraja spinicauda*	2	2	34.5	34.5	74.9	115.3	115.3
451	*Boreogadus saida*	43	43	4.8	4.8	10.5	27.8	27.8
865	*Careproctus reinhardti*	5	5	9.2	9.2	11.1	14.1	14.1
27	*Centroscyllium fabricii*	448	319	13.8	14.9	50.7	67.3	70.4
150	*Clupea harengus*	1591	1015	15.8	19.3	25.9	37.8	40.2
829	*Cottunculus microps*	4	4	5.9	5.9	9.3	12.4	12.4
721	*Cryptacanthodes maculatus*	6	6	50.9	50.9	79.0	85.0	85.0
849	*Cyclopterus lumpus*	82	82	7.8	7.8	13.3	43.7	43.7
208	*Cyclothone microdon*	3	3	5.2	5.2	6.4	7.0	7.0
461	*Enchelyopus cimbrius*	1113	667	5.1	6.1	20.4	29.0	31.7
618	*Epigonus pandionis*	1	1	15.5	15.5	15.5	15.5	15.5
711	*Eumesogrammus praecisus*	147	108	10.0	10.1	14.7	21.5	22.1
844	*Eumicrotremus spinosus*	171	153	2.9	3.0	5.6	12.5	13.0
845	*Eumicrotremus spinosus variabilis*	1	1	7.2	7.2	7.2	7.2	7.2
438	*Gadus morhua*	4338	2115	4.0	15.7	38.6	70.1	94.5
439	*Gadus ogac*	6	6	17.2	17.2	28.2	37.8	37.8
426	*Gasterosteus aculeatus aculeatus*	3	3	6.0	6.0	6.1	7.2	7.2
890	*Glyptocephalus cynoglossus*	2333	1779	6.2	9.3	30.2	43.8	51.6
746	*Gymnelus viridis*	8	8	12.5	12.5	14.9	17.2	17.2
823	*Gymnocanthus tricuspis*	101	86	6.7	8.0	14.8	22.7	24.0
809	*Hemitripterus americanus*	11	11	5.2	5.2	27.7	34.2	34.2
889	*Hippoglossoides platessoides*	5426	2412	3.3	8.3	21.5	41.6	54.0
893	*Hippoglossus hippoglossus*	113	111	23.0	25.8	56.5	147.0	158.0
832	*Icelus spatula*	27	27	4.6	4.6	9.1	14.0	14.0
285	*Lampadena speculigera*	1	1	15.2	15.2	15.2	15.2	15.2
836	*Leptagonus decagonus*	129	96	6.5	7.0	20.1	22.6	22.8
717	*Leptoclinus maculatus*	124	96	9.1	9.1	13.8	20.2	20.3
891	*Limanda ferruginea*	37	33	15.5	15.5	28.5	36.5	36.5
862	*Liparis gibbus*	40	25	6.5	6.5	9.6	23.0	23.0
857	*Liparis* sp.	1	1	2.5	2.5	2.5	2.5	2.5
966	*Lophius americanus*	8	8	8.6	8.6	58.2	89.7	89.7
716	*Lumpenus lampretaeformis*	137	102	16.2	16.5	31.0	41.2	41.7
750	*Lycenchelys paxillus*	3	3	20.5	20.5	23.5	24.8	24.8
752	*Lycenchelys verrillii*	5	5	10.0	10.0	12.0	13.6	13.6
727	*Lycodes esmarkii*	9	9	11.5	11.5	23.0	45.6	45.6
728	*Lycodes lavalaei*	68	61	8.6	8.6	20.6	56.6	56.6
734	*Lycodes terraenovae*	2	2	27.7	27.7	33.4	39.1	39.1
730	*Lycodes vahlii*	372	273	7.2	9.4	27.0	37.5	49.4
91	*Malacoraja senta*	746	724	8.4	9.0	17.3	58.9	61.5
187	*Mallotus villosus*	1321	717	5.9	8.4	14.5	17.1	19.4
441	*Melanogrammus aeglefinus*	5	5	25.0	25.0	44.0	52.8	52.8
745	*Melanostigma atlanticum*	305	209	5.2	8.0	11.0	13.6	14.4
449	*Merluccius bilinearis*	55	56	12.2	12.2	32.3	39.2	39.2

Code STRAP*	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
272	Myctophidae	6	6	4.9	4.9	6.4	7.6	7.6
819	*Myoxocephalus scorpius*	181	153	18.1	18.2	30.0	42.2	45.1
817	*Myoxocephalus* sp.	2	2	3.7	3.7	4.0	4.3	4.3
12	*Myxine glutinosa*	1643	822	20.9	22.6	36.0	48.0	54.2
368	*Nemichthys scolopaceus*	1	1	46.5	46.5	46.5	46.5	46.5
278	*Neoscopelus macrolepidotus*	1	1	12.3	12.3	12.3	12.3	12.3
478	*Nezumia bairdii*	1334	642	7.2	11.5	23.4	31.5	34.7
275	*Notoscopelus elongatus*	9	9	10.8	10.8	14.1	16.7	16.7
856	*Paraliparis copei copei*	10	10	7.9	7.9	10.9	13.0	13.0
444	*Phycis chesteri*	328	257	14.9	16.6	24.9	36.5	38.5
443	*Pollachius virens*	1	1	60.3	60.3	60.3	60.3	60.3
892	*Reinhardtius hippoglossoides*	7031	3437	5.8	14.4	29.2	55.3	75.6
572	*Scomber scombrus*	20	20	6.1	6.1	23.8	32.4	32.4
398	*Scomberesox saurus saurus*	5	5	27.1	27.1	34.7	37.5	37.5
793	*Sebastes norvegicus*	18	18	38.2	38.2	48.5	52.6	52.6
792	*Sebastes* sp.	15670	6444	4.5	9.4	18.6	41.4	47.6
814	*Triglops murrayi*	388	213	7.2	7.3	11.1	16.2	17.2
447	*Urophycis tenuis*	776	737	20.8	23.0	36.2	63.6	86.5

Invertebrates

Code STRAP*	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
8138	*Argis dentata*	439	0	0.78	1.11	1.81	2.43	2.49
8113	*Atlantopandalus propinqvus*	130	0	0.73	0.78	1.94	2.40	2.46
8206	*Cancer irroratus*	1	1	2.80	2.80	2.80	2.80	2.80
8213	*Chionoecetes opilio*	636	314	0.80	1.10	8.30	12.70	13.30
8075	*Eualus fabricii*	51	0	0.59	0.59	0.85	1.06	1.06
8081	*Eualus gaimardii belcheri*	3	0	1.27	1.27	1.48	1.52	1.52
8080	*Eualus gaimardii gaimardii*	16	0	0.82	0.82	0.97	1.44	1.44
8077	*Eualus macilentus*	109	0	0.53	0.67	1.05	1.34	1.35
8033	*Eusergestes arcticus*	42	0	0.64	0.64	1.27	1.92	1.92
8217	*Hyas araneus*	51	27	0.60	0.60	4.20	9.00	9.00
8218	*Hyas coarctatus*	138	65	0.50	0.50	2.50	6.60	6.90
4753	*Illex illecebrosus*	32	32	4.40	4.40	12.50	19.00	19.00
8092	*Lebbeus groenlandicus*	95	0	0.64	0.64	1.51	1.94	1.94
8095	*Lebbeus microceros*	1	0	1.21	1.21	1.21	1.21	1.21
8093	*Lebbeus polaris*	137	0	0.66	0.67	1.01	1.46	1.60
8196	*Lithodes maja*	155	127	1.60	1.90	8.30	11.70	11.80
8111	*Pandalus borealis*	19841	761	0.53	1.09	2.20	2.77	3.06
8112	*Pandalus montagui*	1753	0	0.57	0.83	1.52	2.49	2.93
8057	*Pasiphaea multidentata*	1755	0	1.05	1.41	2.39	2.99	3.42
8056	*Pasiphaea tarda*	3	0	3.36	3.36	3.64	3.99	3.99
8135	*Pontophilus norvegicus*	360	0	0.74	0.84	1.31	1.67	1.70
8129	*Sabinea sarsii*	31	0	0.85	0.85	1.08	1.53	1.53
8128	*Sabinea septemcarinata*	146	0	0.76	0.78	1.17	1.69	1.72
8119	*Sclerocrangon boreas*	268	0	0.98	1.11	1.81	2.80	2.83
8035	*Sergia robusta*	2	0	0.86	0.86	1.38	1.89	1.89
8087	*Spirontocaris liljeborgii*	27	0	0.78	0.78	1.12	1.57	1.57
8084	*Spirontocaris sp.*	2	0	0.81	0.81	0.94	1.07	1.07
8085	*Spirontocaris spinus*	54	0	0.55	0.55	1.05	1.54	1.54

** Codes for vertebrates and invertebrates used by the Quebec Region of DFO (Miller and Chabot 2014).*

*** P1 : 1st percentile P99 : 99th percentile*